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IRIDOTASIS OPERATION FOR GLAUCOMA.

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This paper records the conversion of its author by personal experience to confidence in the operation of iridotasis for glaucoma. It gives the technic employed and an estimate of the value of this operation, which he considers the simplest procedure used for the purpose, and most free from danger.

Of all the surgical procedures introduced in recent years in the field of ophthalmology, none has been accorded so skeptical a reception as that extended to the iridotasis operation for glaucoma; and with good reason. That so apparently unsurgical a surgical measure should be looked upon with suspicion by the older operators is only natural. That it has been slow to win advocates is but a healthy reflection of the wise conservatism of the ophthalmic surgeon. To incarcerate the iris in a surgical wound has always been regarded in the light of a faulty technic, or as an unavoidable accident. Yet, in the operation in question, this very factor is deliberately utilized, and apparently accomplishes what the application of conventionally sounder surgical principles so frequently fails to achieve, namely, adequate drainage.

Some years ago I arrived at one fairly definite conclusion in regard to the cure or arrest of the symptoms of glaucoma. After having practiced, one after another, the various procedures advocated from time to time by different operators, and having discussed the subject with others, it seemed to me that, so far as results were concerned, it did not matter very much which surgical procedure was employed; the immediate results appeared to be about equally satisfactory, i.e. the lowering of the tension and the relief of the symptoms resulting therefrom. Time, however, so frequently told the same disappointing story, namely, inadequate drainage and progressive diminution of vision. At that time I was inclined to think that the surgical manipulation, per se, brought about some condition which for a time favored drainage. Perhaps this condition was due to an altered position of the pectinate ligaments, secondary to the change in the direction of traction or relaxation, resulting from the iridectomy, iridotomy, or iridodialysis, producing an altered status favorable to the functioning of the spaces of Fontana and the crypts of Fuchs; perhaps something else.

An examination of microscopic slides of a glaucomatous eye invariably impels one to the deduction that no operation which depended upon a reestablishment of the fluid exit from the eyeball by way of the canal of Schlemm could have been successful. The typical picture shows the root of the iris adherent to the posterior surface of the cornea, thus cutting off the drainage angle, and the operated area filled with organized, nonfilterable tissue, etc.

Largely from this array of evidence, both clinical and microscopic, and the theoretic deductions to which it gave rise, I came to the conclusion that until we knew more about the etiology and early diagnosis of glaucoma, the restoration and maintenance of adequate drainage by way of the canal of Schlemm was bound to be a more or a less doubtful issue in a large percentage of cases. In this attitude of mind, it was very natural for me to adopt the iridotasis operation when, some five years ago, it was brought to my at-

tention. Here was a procedure which depended for the maintenance of drainage upon the establishment of communication between the anterior chamber and the subconjunctival spaces. The idea of changing the direction of the fluids appealed to me as logical and distinctly attractive.

As I recall my first introduction to this operation, greater stress was laid upon the traction upon the iris upward, thus widening the spaces of Fontana, than upon the drainage into the subconjunctival spaces. Today, however, I believe that the first named factor can be dismissed as of little or no moment. It seems to me that the advantage obtained in the widening of the spaces of Fontana below is offset by the crowding of the spaces above, constituting the same old story over again. Cases which were operated on over four years ago disclosed an edematous area over about the upper two-fifths of the eyeball, slightly elevated and with a tension of 22 or less, by Schiötz. A rechecking of the older cases was distinctly favorable to the procedure, that is to say, from the standpoint of permanent drainage, improving with time; for the older cases appeared better than the more recent ones.

When we started this work, we had primarily but one objective in mind, namely, to prove, if possible, the establishment of drainage from the anterior chamber into the subconjunctival spaces by the interposition of the iris in a corneoscleral wound. Accordingly, every case that came into our service displaying definite evidence of glaucoma, regardless of the fact that many of them were totally blind, or had bare light perception, was operated.

A general summary of the cases operated on in this early period, i.e. four years or more ago, which we were able to reexamine and check up with our previous findings, discloses a distinct freedom from all symptoms of increased tension. A tension of 22 or better was obtained by the Schiötz tonometer. The perimetric fields taken did not show any improvement, or any perceptible loss. The vision, likewise, was not improved for the distant charts, altho all patients claimed that they could see better, except one, who displayed a central opacity of the lens. The operated eyes presented, externally, a nonirritable eye, pupil pear shaped and drawn upward, with a broad, slightly elevated, edematous area around the site of the incarcerated iris.

TECHNIC USED AT THE PRESENT TIME.

The eye is prepared in the usual manner for an intraocular operation. The patient is given morphin with atropin about one hour before the operation, hypodermically. Cocain anesthesia is used, (4%) as in cataract work, and one or two drops of adrenalin instilled just before starting to operate. One must frequently use adrenalin during the operation, owing to the stasis in the deeper vessels. I prefer to stand back of the patient and have him look down as far as possible. A small tissue forceps is used to grasp the conjunctiva above, and a dissection is then made, with a pair of ordinary blunt pointed tenotomy scissors, of about two-fifths of the conjunctiva, from above down to the limbus. Here I use a light lateral movement until I reach the translucent cornea, as in the trephining operation. Hemorrhage may be quite free at this stage, so that adrenalin and slight pressure may be necessary.

With the patient still looking downward, the dissected conjunctiva is held with a forceps in the left hand so that the flap can be moved freely, thus permitting the operator a view of the anterior chamber. A small keratome is now made to enter the anterior chamber as near to the anterior surface of the iris as possible, making an incision of about 4 mm. The point of the keratome is then tilted slightly downward, and as it is slowly withdrawn it is made to brush lightly the anterior surface of the iris, which will sometimes prolapse into the wound. During the use of the keratome, after one has definitely decided upon the point of entrance, it is advantageous to

bring the conjunctival flap, held by the left hand, upward, so that the operator can see the instrument in the anterior chamber. One should try to avoid, as much as possible, a rapid exit of the aqueous humor.

The next step is that of incarceration of the iris. For this purpose a very thin bladed, preferably single toothed, iris forceps is used. The forceps is made to enter the anterior chamber, grasp the iris midway between the pupillary border and the root, and draw it into the corneoscleral incision, just enough to keep the lips of the wound apart. It is well to force the iris into both ends of the incision as much as possible, thus reducing the chances of its falling back into its former position. The iris is then lightly stroked away from the wound with a spatula, and the incised conjunctiva brought together with one or two sutures. One or two drops of atropin sulphat are now instilled into the eye, a dressing applied, and the patient returned to bed. The eye is redressed in about two days and atropin again instilled. The sutures are removed in four or five days and atropin instilled daily until all the congestive symptoms have disappeared. We usually have patients wear London smoked glasses as soon as the sutures are removed.

ESTIMATE OF VALUE.

Up to the time of writing, which is the early part of December 1922, I have practiced this procedure for almost five years with results more gratifying than from any other procedure that I have used in the past. In the last two or three years, I have employed the technic given above in every form of glaucoma where I felt that I could incarcerate the iris. Where the iris is atrophic or friable, and it is apparently impossible to draw it into the wound, the operation is, of course, not practical. However, one can sometimes find some portion of the iris which appears sufficiently normal to warrant manipulation. It is not absolutely necessary to incarcerate the iris at 12 o'clock, altho this position is preferable. I recall one colored man in whom I was compelled to do two incarcerations in each eye, with fairly good results. The patient is free from all symptoms.

In the acute stage of the congestive type of glaucoma, I prefer not to operate until the eye is fairly quiet, resorting, in the interim, to every possible means to reduce the active symptoms. In the socalled secondary glaucoma, i. e. secondary to trauma, neoplasm, iris bombé, or acute iritis, it is naturally not indicated.

Up to this time I have not been compelled to do an enucleation as a result of this operation. However, in one old man, over 70 years of age, with high blood pressure, positive urinary findings, etc., and so crippled that he was obliged to use a wheel chair, I had an unpleasant experience. He had only one eye, in which light perception was present. The cornea was very small, the anterior chamber very shallow, and the tension, taken by the Schiötz tonometer, was over 70. When the corneal incision was made, the anterior chamber filled with blood; this I tried to express by milking, as we do in a cataract operation for residual lenticular matter, but was unable to do so. I was compelled to incarcerate the iris as well as possible, but was not sure that I had been successful. At the first dressing the conjunctival flap was very edematous and the anterior chamber was still filled with blood. The tension to the finger remained high for some time, and the blood was not absorbed for some four or five weeks. The iris remained incarcerated; however, the patient was totally blind when discharged. This is the only really bad result that I have had.

Hemorrhage into the anterior chamber, which is usually limbal and not frequent, is of no import other than that it delays one in grasping the iris. Occasionally, during the operation the iris will slip back into its former position, but when once it is definitely incarcerated I have never had the experience of its slipping back. In this respect it is well to make the incision as small as possible; just large enough to permit of the iris being grasped by

the forceps. For this reason, also, a very thin bladed forceps should be used. The grasping of the iris midway between the pupillary border and the root affords a double thickness of iris to be incarcerated, and possibly an inversion of the pupillary border. The tucking of the iris in the lateral ends of the incision by a horizontal movement seems to aid in holding the iris permanently in place, and possibly produces a gaping of the incision in the center which favors drainage. In a few instances I have tried twisting the iris into a pedicle before incarcerating, the idea being a possibly greater gaping of the incision. I have, however, since abandoned this, owing to the development of a bleb, as seen in the trephine operation. I have also reduced the amount of traction upon the iris, thus obviating the badly deformed pupil which results from being drawn up too high.

To me this operation is by far the simplest procedure I have ever used. It is attended with no dangers. In the case of the old man with blood in the anterior chamber, it is, of course, just possible that the light perception he had before operation might have been retained for a longer time if surgery had not been resorted to. Surely no other operation would have been any more successful. I could not at any time illuminate the fundus sufficiently to examine the details. Again, owing to his crippled condition and generally bad physical state, it was virtually impossible to handle him in a public institution, and he insisted upon an operation. For the sake of the record, it would probably have been better not to operate upon him, or else to forget the case.

That we do have permanent drainage or filtration is, I believe, a proven fact; if it is permissible to make such a statement after nearly five years' observation. It will, of course, be interesting to examine microscopic slides, serially cut, from eyes operated upon by this technic. So far, I have not had the opportunity of doing this.

ACUTE GLAUCOMA FOLLOWING HEINE'S CYCLODIALYSIS.

Dr. Y. Yoshida.

KYOTO, JAPAN.

Two cases are here reported and three noted from the literature in which cyclodialysis was followed by a glaucomatous exacerbation. In both the writer's cases, iridectomy was subsequently done and relieved the condition at the time, altho one eye subsequently became blind. Cyclodialysis only slowly overcomes the tendency to increased intraocular pressure and meanwhile can give rise to acute glaucoma. Translated by H. Aufmwasser.

Since the beginning of 1916 until the close of 1921, 22 cases of primary glaucoma were operated upon after Heine's method of cyclodialysis. Among the 27 eyes operated upon, two cases were observed in which acute glaucoma set in immediately after the operation.

This remarkable experience, that an operation for the reduction of intraocular pressure like Heine's cyclodialysis should, contrary to our expectation, result in an increase of intraocular pressure, causes me to report the following cases briefly:

Case 1. A woman, aged 50 years, noticed since January, 1915, a periodic disturbance of vision of short duration. Since January, 1916, this disturbance was more frequent and more prolonged.

Both eyes show no sign of irritation. Transparent media clear. The iris not atrophic. The anterior chamber on both sides rather shallow. The pupils, about 3 mm., react sluggishly to light on either side. The ophthalmoscope showed both papillae distinctly pale with typical glaucomatous excavations. Field of vision: left, narrowed concentrically; right not markedly narrowed. Tension: R., 25 mm.; L., 42 mm. Hg. (Schiötz). R. V. = 6/5. L. V. =6/5.

April 18, at 2 p. m., cyclodialysis was made by Prof. Ichikawa. The operation was normal. Only a small amount of liquid flowed from the anterior chamber, no hemorrhage. At night there was a severe attack of glaucoma in the operated eye, headaches and vomiting.

April 19. The left bulbar conjunctiva is hyperemic and slightly chemotic, especially above. The whole of the cornea is diffusely, mildly cloudy, smoky in character. The anterior chamber is shallower than yesterday. The pupil vertically oval, somewhat displaced upward, about 7 mm. Light reaction absent. T. + 2. Afternoon, nausea and cephalalgia.

April 20. Nausea and headaches continued. Instillation of pilocarpin and eserin. All disturbances somewhat ameliorated. R. V. = 6/8. L. V. = 1/5. Tension: R., 23 mm. L. 43 mm. Hg.

April 22. R. V. = 6/6, partly. L. V. = fingers (meter). L. Surface of the cornea is still smoky. Pupil oval, a little smaller than yesterday. Tension: R., 26 mm. L. 40 mm. Hg.

April 26. R. V. = 6/8. L. V. = fingers 3 meters. L. Cornea distinctly clearer, but light does not enter readily thru pupil.

April 28. Illumination of the fundus is good; no retinal hemorrhages. R. V. = 6/8. L. V. = 6/36.

May 1. A second attack in both eyes. Tension R., 40 mm.; L., 43 mm. Hg.

May 2. Left, classic (antiglaucomatous) iridectomy above.

May 3. Headache still severe. On the left, the surface of the cornea is still dull. In the anterior chamber small hemorrhagic masses. The right corneal surface is also cloudy. R. Tension: 54 mm. Hg., eserin.

May 6. R. V. = 6/24. L. V. = 6/60.

May 8. Tension: R., 44 mm. L., 18 mm. Hg.

May 15. R. V. = 6/60. L. V. = 6/60.

May 17. Iridectomy on the right eye. At night, cephalalgia.

May 19. R. V. = fingers 2 m. L. V. = 6/60.

May 25. Nausea and headaches had stopped.

May 30. R. V. 6/60 with stenopaic disc; —1.5 D. = 1/18: L. V. 6/60 with stenopaic disc; + 1. 5 D. = 6/24. Tension: R., 13 mm.; L., 23 mm. Hg. Discharged.

I had occasion to examine the patient 3 years later, and found that the right eye had eventually become blind, while the left eye had 6/36 vision and normal tension. (22 mm.)

Case 2. A peasant woman, 65 years of age, became blind in her left eye during her 61st year, following a single attack of glaucoma, and within a period of 4 months. Since March 2, 1921, slowly increasing disturbance of vision, without signs of irritation, affected the right eye. She was received in the clinic December 20, 1921.

Right eye. A marked tortuosity of the anterior ciliary veins was observed. The cornea at its center was slightly cloudy. The corneal sensibility was markedly decreased. The anterior chamber was shallow. The pupil 5 mm. wide in the dark room. The ophthalmoscope showed the papilla totally pale, deeply excavated and a distinct glaucomatous halo.

Left. The eyeball has undergone phthisical changes. Tension: R., 43 mm. Hg.; after instillation of pilocarpin, 30 mm. Hg. R. V. = 6/6, + cyl. 1 D. ax. hor. = 6/5. L. V. = 0. The right field of vision shows marked concentric narrowing.

22nd Cyclodialysis on right eye above. The operation was without incidents, only slight loss of aqueous humor, no hemorrhage into the anterior chamber. At night severe cephalalgia came on and vomiting, causing marked disturbance in sleep.

23rd. R. Some pericorneal injection and chemosis, especially downward. The cornea is very cloudy. In the anterior chamber neither hypopion nor hyphemia. The pupil is displaced upward and more dilated than before the operation. From the fundus a slight red reflex is seen. Pressure over the ciliary region causes discomfort. Tension: 54 mm. Hg.

In spite of myotics, there was no relief. Iridectomy upward and inward was performed. During the operation a slight hemorrhage took place into the anterior chamber.

24th. Subjectively improved. The lids are slightly edematous and there still exists slight pericorneal injection. The cornea is slightly cloudy. The pupil and the coloboma are covered with a

small amount of blood. Tension is still high.

26th. The signs of irritation have gradually receded. R. V. = 6/36.

29th. The cornea has regained its luster. On the anterior surface of the lens, coagulated blood and a thin, disc like grayish mass is visible. R. V. = 6/36, with stenopaic disc 6/18. Tension: 16 mm. Hg.

Sept. 1. R. V. 6/12, with stenopaic disc 6/12. Discharged.

It is a well known fact, that an operation upon a glaucomatous eye can, irrespective of the operative method employed, incite an attack of glaucoma on the nonoperated eye. And still an attack of glaucoma on the operated eye is rather a rare occurrence and is worthy of our attention. Only isolated, similar observations have been recorded in the literature. Heine[1] has, among 20 cases of cyclodialysis, encountered in two cases (3 and 5) an acute aggravation of the symptoms. Elschnig[2] has observed one case of increased tension among 86 cases of cyclodialysis, which did not become normal after a subsequent iridectomy. Weekers[3] cites a case of hemorrhagic glaucoma, in which, after cyclodialysis, a severe attack of glaucoma developed. In a case of hemorrhagic glaucoma observed by Komoto[17] after cyclodialysis, severe pain followed, which caused him to remove the eyeball.

In so far as my studies of the literature have shown, the number of such cases are few and probably exhausted with the above 5 quoted. But I believe, that these complications after cyclodialysis occur oftener than one surmises; Heine, among 20 cases had two (10%), and I among 27 cases encountered 7.5%. Its clinical importance should, therefore, not be underestimated.

What causes this dangerous complication? Could it possibly aid us in acquiring the knowledge of the mode of action of cyclodialysis? What is the prognosis of this complication? All are questions which demand our precise clinical observation in the highest degree. As far as the curative action of cyclodialysis is concerned, the opinions seem to be greatly divided.

The first contention of Heine[1-3] that cyclodialysis caused a permanent communication between the anterior chamber and the supraciliary space, by freeing the angle of the anterior chamber and detaching of the ciliary body, was denied by Krauss[5], who, in animal experiments, could not verify free communication between the anterior chamber and the supraciliary space conforming to Heine's theory. On the contrary, he found densely organized cicatricial tissue between the detached portion of the ciliary body and the inner surface of the sclera. Krauss[7] considers that the action of reducing pressure in cyclodialysis is due to atrophy of the ciliary body, produced by traumatism and consequent diminution of secretion of the aqueous humor. Wychodtzew[4] and Judin[6] could verify the experiments of Krauss. Salus[14] agrees with Krauss, and remarks, that "detachment of the choroid can only occur after cyclodialysis, when the condition of increased pressure, almost always following cyclodialysis, is only of short duration; and when the edema of the ciliary body, caused by the intervention, recedes more rapidly, and if the hemorrhagic masses are absorbed before the denuded parts can organize into cicatricial tissue. This cicatrization is produced relatively quickly and probably is complete."

Wernicke[8], however, found in his experimental study, a delicate cicatrix between the ciliary body and the sclera, but not firm, as the other experimenters have proclaimed. He seems to think, that the new formed, delicate cicatrices between the ciliary body and the sclera, are likely to drain the aqueous humor from the anterior chamber. Heine has lately modified his theory somewhat; he considers that, instead of a broad detachment as previously described, a capillary fistula formation between the ciliary body and the sclera takes place, which drains the aqueous humor from the supraciliary space.

Contrary to this, Salus (l. c.) remarks that it is incomprehensible why

the cicatricial process between the choroid and the sclera should continue to the smallest capillary fistula, then come to a sudden and final stop. Experiments in regard to the action of filtration of the liquid thru the cicatricial tissue made by Elsberg[12] favors his findings, and are also contrary to Heine's opinion. Salus continues, that if it were the case, "the capillary fistula, coming from a portion of the angle of the anterior chamber and going to a portion of the supraciliary space which is not demonstrable anatomically, could create as marked pressure reducing action, as trephining produces, altho the effect in cyclodialysis comes later than in trephining." Salus finally recalls the paper of Krauss[7] and says: "The pressure reducing action in cyclodialysis is likely principally due to the changes that occur in many afferent arteries; and also perhaps to injuries to the ciliary veins, followed by slow mild cyclitic symptoms producing partial atrophy of the ciliary body. Reduction of the secreting structures bring about the reduction of pathologic tension and the following hypotony depends on the degree and extent of the atrophy of the ciliary body." Meller[13] in his latest paper agrees with Salus.

How then can we account for the sudden attack of glaucoma on the eye operated on by cyclodialysis? Even if the effect obtained by cyclodialysis is not clear by any means, certain it is, that this operation at times normalizes glaucomatous pressure and effects a a cure in glaucoma. But cyclodialysis is an operation which reduces pressure only gradually; shortly after the operation the tension is frequently even a little higher. This postoperative increased tension at the beginning could perhaps be caused by swelling of the ciliary body due to trauma, as Salus has pointed out. It is, therefore, no wonder, that cyclodialysis can occasionally cause an attack of glaucoma. especially when the eye is predisposed to it.

I believe, that the occurrence of this postoperative increase in pressure can, even if rarely, give rise to an acute attack of glaucoma, contrary to the views of Heine relative to the effect of cyclodialysis. If draining fistulae between the anterior chamber and the supraciliary space are really produced thru cyclodialysis, as Heine takes for granted, an increase of tension immediately after operation could hardly take place. All fistula producing operations act entirely differently from cyclodialysis. Their effect, in all of them, is "drastic." Immediately after operation a high grade decrease in tension takes place, never an increase of tension. The latter only occurs when the lumen of the fistula has become impervious thru gradual formation of cicatricial tissue. Consequently cyclodialysis can not be an operation depending upon the formation of fistula for its results.

It is well known that each operation has its advantages and disadvantages. The greatest advantage of cyclodialysis is its relative safeness; its disadvantage, its limited permanence. The disadvantage may be overcome by better technic and selection of the cases, as described in the latest communication of Salus. The socalled safeness, which has to date been regarded as a great advantage of cyclodialysis, does not agree with the occurrence of above mentioned complications. The slight postoperative increase in tension is harmless, but the occurrence of glaucoma is to be viewed as a dangerous complication. The occurrence of this condition following cyclodialysis seems to be unavoidable at times, because the two conditions, the swelling of the ciliary body due to trauma and the disposition of the eye to acute increased tension, can occasionally concur and cause the occurrence of an acute attack of glaucoma.

Can we solely, on account of this complication bring the curative action of cyclodialysis into discredit? The prognosis of this complication, which after present experiences appears to be bad, however is better than late infection in trephining after Elliot. When we exclude the two cases of hemorrhagic glaucoma (Weekers and Komoto), only 3 cases of primary glaucoma remain, in which a postoperative acute increase of tension occurred. Among these 3 cases, in which

supplementary iridectomies were made, in one case of chronic glaucoma of Elschnig, and in one case of acute glaucoma of Heine's, no improvement took place; and the eye finally became blind. Only in the one remaining case of Heine, the tension spontaneously improved without any other tension reducing operation becoming necessary. In my two cases, supplementary iridectomy was made shortly after manifestation of glaucoma. The first case retained 6/18 to 6/24, and in the second case the vision was 6/8. But examination of the first case, 3 years after iridectomy, showed the right eye to be blind.

Thus, among 5 cases of primary glaucoma in whom a postoperative acute tension after cyclodialysis occurred, two showed an improvement, while in the 3 remaining cases no improvement was noted.

At all events the number of cases is still too limited, and in order to come to any conclusion regarding the prognosis of this complication, more experience must be collected.

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THE MECHANISM AND USE OF A VARIABLE FIVE MINUTE TEST LETTER.

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PHILADELPHIA.

The letter V is capable of such variations in size by screening that while preserving its form it can be adapted to the five minute angle of Snellen for any distance from 6 to 120 meters. By the simple mechanism here described this can be done and the inclination of the arms so varied as to furnish a test for the direction of the principle meridians of astigmatism. Read before the Section on Ophthalmology of the Philadelphia College of Physicians, October 19, 1922.

In the usual methods by which test cards are used for estimating vision and as an assistance to refraction, several common difficulties are met with:

1. The largest letter of the test card, at standard distance, falls outside the patient's visual range. Thus at six meters, the VI/LX letter cannot be seen, under cycloplegia, by hyperopes or myopes of three diopters and over; it is not seen by amblyopic or highly astigmic patients.

2. In estimating the end point of a refraction, it is often difficult to maintain a patient's attention upon a given single letter of the test card, and, therefore, the benefit of most accurate refraction is occasionally lost to the patient.

3. In the determination of an astigmic axis, the oculist usually requires the aid of special tests, not available in the test card, to confirm the examination by ophthalmometer and retinoscope. By this is meant some subjective test such as the astigmatic dial, or the rotating V of Maddox.

4. Test letters, as such, are not a precise test of visual acuity. Thus, in a given line, some letters will be more easily recognized than others.

5. In passing from one line to the next on a test card, it is obvious that it is a jump from letters of one size to letters of a different size, and that the intermediate gradations are, from necessity, omitted.

6. There is at present no entirely satisfactory method of quantitative standard illumination for test cards.

The first of these difficulties is met by using larger test objects or letters; or by using standard cards at shorter distances and recording the vision in this manner.

In final estimation of a patient's refraction, many oculists find it useful to have a patient concentrate attention upon one letter (a single symmetric letter, such as V, T, or H), as in this way very slight alterations of a cylinder axis, addition or subtraction of

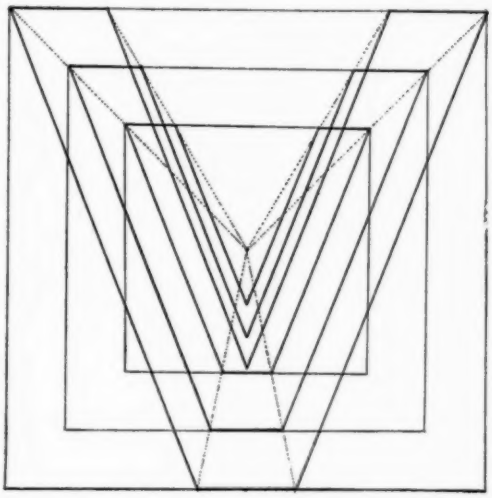

Fig. 1. Diagram to show the letter V on a 5' scale constructed in different sizes, with a common center for the construction squares. This center forms the theoretic vanishing point.

low power lenses, will cause very noticeable subjective variations, which entirely escape the patient if allowed to fix at will on any of the letters or lines in a given card. In other words, by fixation of a single symmetric letter, a cylinder rotated in front of the eye will cause shade variations in the two halves of the letter, much as in the Maddox astigmatism test, and small changes in the strength of a lens are readily detected. It is, of course, difficult to maintain the attention of an unintelligent patient upon a single letter in a line.

Frequently the use of test letters reveals the presence of an astigmic meridian,[1] and Maddox has shown,[2] by the use of a rotated V, that shade

variations in the two halves of such a symmetric letter may be used as a reliable method for determining the astigmic axis.

interfere with a successful refraction. Patients who have suffered a partial nerve atrophy, or the early stage of a toxic amblyopia, may recognize test

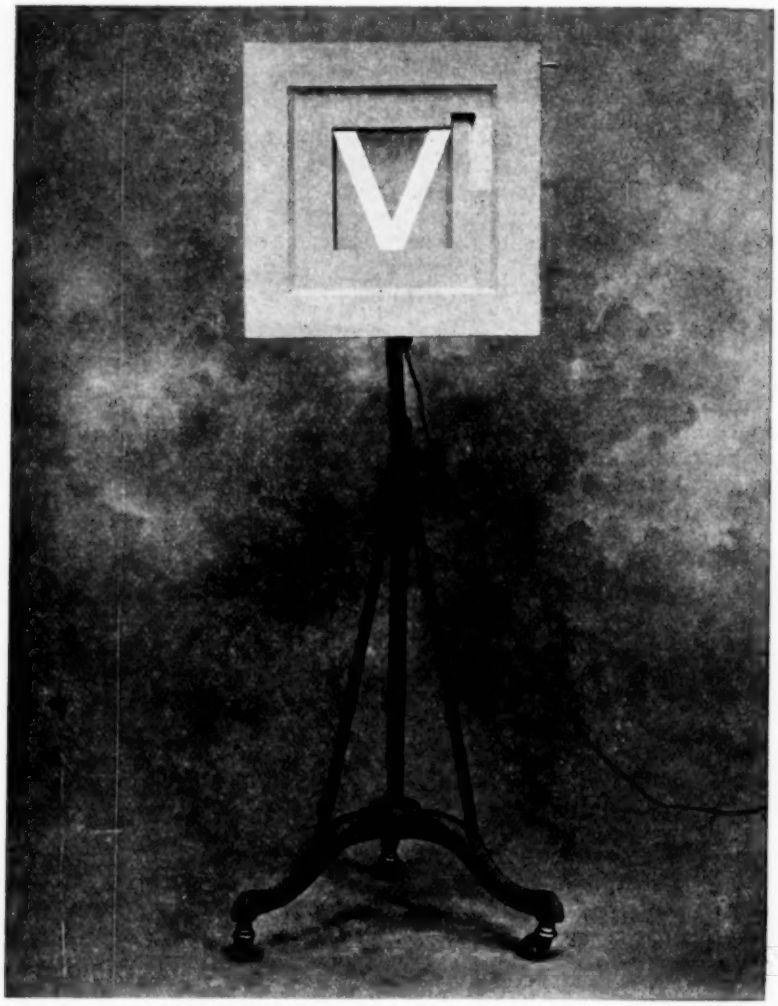

Fig. 2. Appearance of apparatus and stand ready for use. Letter aperture open to full extent.

It has been shown by Jackson and others,[3] that standard test letters of the same size are not an accurate index of visual acuity; in a line of 5′ letters, some will be more readily recognized than others. More accurate tests have been devised: cards requiring a distinction between standardized squares and circles, broken circles, and, more recently, the Ives' screen tests.[4]

Finally, varying illumination or unequal illumination of a test card may

letters more easily in a dim light than under brilliant illumination. At present, indirect illumination of the test card, controlling the intensity by a rheostat, is the best method available. The results are, however, only qualitative and do not conform to any standard.

The writer has interested himself in these problems and has originated an experimental apparatus, which to some extent has solved the difficulties.

It was desired that a standard 5′ letter be arranged in such a way that variations in size from a vanishing point to a 20/400, or theoretically larger, letter might be possible. Such an expanding form is exemplified by the aperture of an iris diaphragm, gradually opened. The problem was attacked in several ways; thus an opaque letter was projected as a shadow upon a screen and variations of size produced by varying the distance of a source of illumination. This in turn caused changes in the intensity of shadow, which again was controlled by increasing the illumination strength with the distance. This and several other experimental methods proved unsatisfactory and were abandoned.

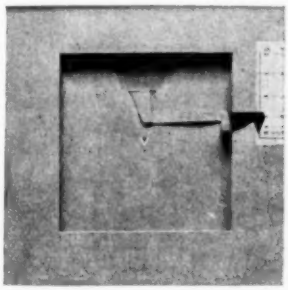

Fig. 3. Shows the complete closure of the screen reducing the letter to a single point.

The problem was solved in another way. The letter V was selected, on account of its symmetry and simplicity, and was constructed on the 5′ scale in a number of different sizes, with the construction squares arranged to have a common center. (Fig. 1.) A set of five screens was then devised and a mechanism added so that the differential movement of the screens at all times outlined a 5′ letter V (Fig. 2.)

Thus it became possible, having the construction squares with a common center, to use this center as the theoretic vanishing point; when the screens are entirely closed no letter is seen. (Fig. 3) but as they are opened, a 5′ letter V is disclosed and gradually enlarges to any desired size, at all times retaining its 5′ construction. (Fig. 4 and 5.)

The screens are cut from brass and are operated by a mechanism of double threaded rods and cogs; the entire mechanism is controlled by a single easily moving handle. (Fig. 6.)

The aperture of the screens outlines the letter; back of the opening is placed a ground glass and a lamp chamber with a variable light, whose intensity can be read directly in terms of candle power.[5]

The entire device is arranged for rotation about its central axis, the vanishing point of the letter. On the back of the lamp chamber, a dial and arrow indicate the axis of the apparatus in various positions of rotation. (Fig. 8.)

The letter is calibrated in the foot and metric scales, an arrow, mounted on one of the screens, following the expanding letter and indicating its exact size at any point.

USE OF THE APPARATUS.

a. Recording of Vision.—The patient is seated at six meters distance, in direct line with the apparatus, and with

Fig. 4.

Fig. 5.

Fig. 4. Shows the letter formed by opening the screen. Fig. 5, shows a larger letter by opening the screens more widely. All intermediate sizes may be obtained.

one eye covered in the usual manner. The patient is instructed that when the screens are opened, a point or spot of light will be seen, which will gradually take the form of a letter. The patient indicates when the letter is distinguished and the examiner records the vision from the scale reading. The apparatus accurately records in the range from VI/IV to VI/CXX (20/400), giving all intermediate gradations.

b. Determination of Astigmic Axis.— The apparatus is used in a manner similar to the rotating V test of Maddox, the subjective phenomena being of a slightly different character. The patient with astigmatism sees a letter whose outlines are blurred, and the V apparently thrown into a three dimension trough form. (Fig. 7.) When the V is symmetric with the astigmic axis, the trough is symmetric and both halves are equally luminous. When the V is "off axis," one arm of the letter immediately becomes brighter than the other and the trough sways toward the brighter arm. When the letter is rotated to the point at which the two halves of the V are equally bright, the axis is read from the dial and arrow on the back of the apparatus. This axis is, of course, confirmed by other tests, such as the retinoscope, ophthalmometer, and the subjective choice of the patient.

c. The End Point of Refraction.— When retinoscopic and ophthalmoscopic examination of the patient is completed, the patient is again seated before the apparatus and the retinoscopic finding, with proper deduction placed before the eye. The size of the letter is now changed to VI/X, VI/VI, or to a size compatible with the probable corrected vision of the patient.

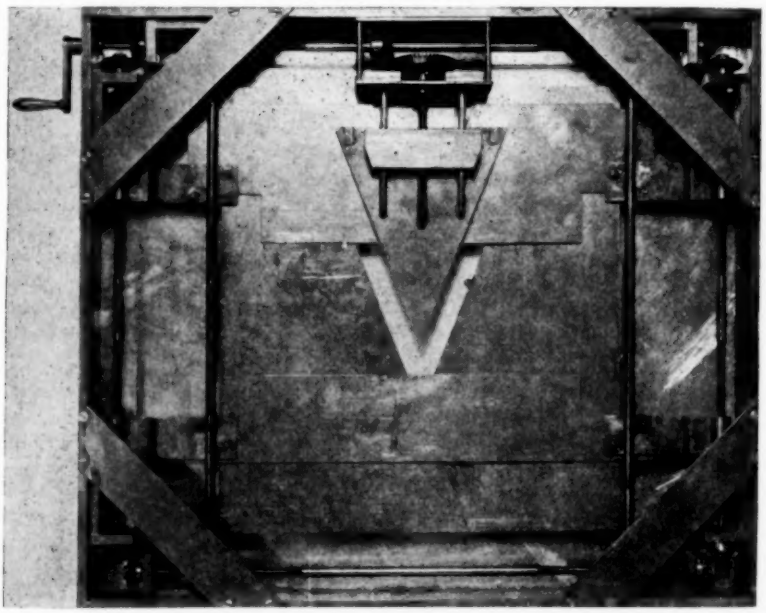

Fig. 6. Mechanism and screens outlining the variable 5′ test letter. All screens are controlled thru the small crank at the upper left. Five separate screens are required, each operating independently.

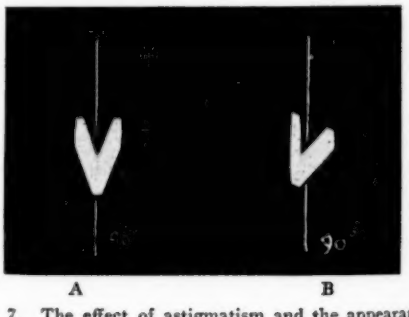

Fig. 7. The effect of astigmatism and the appearance of the V. A, when the V is symmetric with the astigmatic axis; B, when it is off axis.

The letter is then used as a test object and the refraction completed in the usual manner, the patient indicating whether an addition or subtraction of lens makes the test object "better or worse."

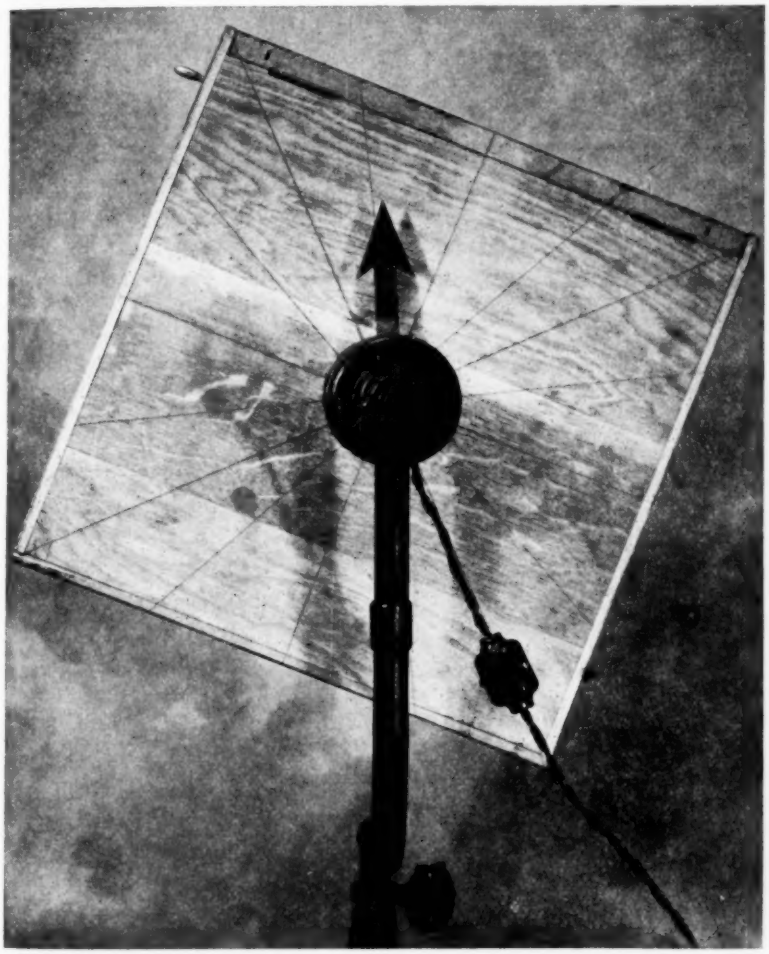

Fig. 8. Near view of apparatus showing electrical connections and arrangement for rotation about central axis. The dial and pointer indicate deviations from the vertical meridian.

d. The Corrected Vision.—It is often useful to record the vision of the corrected eye, after the patient has secured the glasses prescribed. The apparatus will accurately indicate and differentiate corrected eyes which have a visual acuity of VI/IV, VI/V, VI/X, etc.

SUMMARY.

1. The variable size of the letter permits it to be used, in its larger sizes, for the recording of defective uncorrected vision ordinarily falling without the range of test cards.

2. In its smaller ranges, the letter may be used as a fixation object for the end point in refraction estimation.

3. Arranged for rotation about its central axis, the apparatus may be used to determine and confirm an astigmic axis.

4. As a variable test object with a standard illumination, the letter may be used with precision as an index of visual acuity. The illumination of the letter is always constant per unit area.

No attempt has been made to motorize the apparatus or to simplify its con-

struction. *It remains an experimental apparatus*, with the assistance of which an entire refraction may be carried out, and permits a range of accurate method far beyond that of existing test cards.

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A REVIEW OF KERATOPLASTIC SURGERY AND SOME EXPERIMENTS IN KERATOPLASTY.

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KALAMAZOO, MICH.

This paper reviews the published accounts of attempts at keratoplasty during the last one hundred years; most of them were doomed to failure, because of the impossibility, now understood, of grafting on one animal the cornea from another species. It also records experimental work done by its author and C. R. Bridgett, in which the corneal flap was made triangular and the three angles stitched into place. This work was done in the Department of Surgical Research in the University of Pennsylvania.

The most natural suggestion is, of course, to make use of an easily obtainable animal cornea for the purpose of corneoplasty. This is the method followed in by far the greater part of the work of the past; but the work of recent years in the transplantation of tissue, has established the principle of the individual specificity of tissue. Not only are tissues specific to the species, and so specific that there is no hope of transplanting tissues from one species to another, but it seems now generally agreed that there is an individual specificity within the species itself. It is for this reason that Thiersch grafts taken from the patient himself give a higher percentage of takes; that bone grafts from the same body give better results than grafts from some other individual; and that transfusion of blood must be held within the group.

It is therefore clear that the greater part of the work to be reviewed in the following pages has only a historical interest, and yet it appears worth a review, as an instance of the great interest which the subject has excited among ophthalmologists. It is also clear that as long as there is this biologic specificity of the tissues, with the fundamental impossibility of getting a result with a tissue which could not possibly heal in place, all the other theoretic questions, such as the influence of aqueous humor upon the transplant, etc., are left unanswered, nor can they be answered upon the basis of work done with disregard of this fundamental biologic law.

There are many reasons, therefore why the question is worth further work, which led us to undertake the experiments which are reported later in this paper.

In 1823 Reike performed the first keratoplastic operation, and in the following year Reisinger operated on a series of animals and secured fairly good healing results in two instances. In 1827 Schoen recommended the operation for adherent leucomas, complete opacities, staphylomas, and in cases when artificial pupils were valueless. In recounting the difficulties, he contended that the incision was made in diseased tissue, and that the surrounding parts were abnormal; that the new flap laid on a poor foundation and the time required for its modeling gave it time to devitalize; that if one corner projected it caused conjunctivitis with painful ocular movements; that wounding such an eye was considered dangerous; that muscular contractions may cause expulsion of the lens and vitreous; that if the operation was poorly done and the eye in a state of partial collapse, the flap could not

be properly fitted; that the flap may be displaced and the contents of the globe expelled; that dangerous pressure and severe pain may be caused by damming up the tears behind the lids, and that such eyes tolerate inflammations badly. Schoen also said that Reisinger failed to state from which animals the transplants were to be taken, and the fact the operation had only been done on animals rendered its application as a test unworthy to humans. He also stated that careful selection should be made, and a diseased staphylomatous eye with only light perception had better be left alone.

In 1831 Dieffenbach stated that he feared suppurations, overgrowths and clouding of the flap; and cited two cases where the cornea was severed except a small bridge, in support of the above statement. He experimented on rabbits, dogs and pigeons, making sections in which narrow bridges were left, secured them with the finest suture material, taking care not to enter the anterior chamber; nevertheless the sutures suppurated in two days, and this was followed by hypopion and opacity. He considered the completely severed cornea dangerous because of a lack of primary union and expulsion of the globe. He then tried another method, in which he made a section like for cataract and then introduced two sutures above; next he severed the lower half of the cornea and again stayed it with two sutures. There was no primary union and the sutures suppurated, but this he blamed on the action of the aqueous on the flap border. Next he developed a new operation in which he did a peritomy; a pig's cornea was sutured in situ, and after it healed he attempted to remove the opaque cornea underneath thru an opening like a cataract extraction. The procedure was not satisfactory.

Strauch did experimental work upon animals for several years, but because his results were all failures he made no report until 1840. His most recent experiments were made after the method of Thome and Wurtz of Bonn, in which the rabbit was secured in a box with only the head exposed; a section like for cataract was made and completed with scissors, leaving a 2 mm. border of cornea. The transplant was secured with mattress sutures horizontally placed; out of six operations five were complete failures, and in the sixth, only, no vitreous was lost. Dismayed by these results, he developed a new method which he felt was superior in suturing and sectioning, because the movement of the animal was almost nil. The rabbit was placed in a bag and fastened with adhesive plaster, the sutures were introduced first, then the section was made with a staar lance; after this was completed the two sutures in the anterior chamber were raised, cut and rethreaded, then placed thru the transplant and tied.

In 1844 Feldman experimented on rabbits with good healing results. In 1853 Nussbaum, after he had noted all the corneoplastic failures, became enthused with the novel idea of an artificial cornea. Experimenting on himself he embedded subcutaneously gold, silver, copper and glass balls to determine which was the least irritating. Glass was the answer, as it seemed to unite with the tissues, and he thought it would do the same with the cornea. He had little collar buttons made 3 mm. in diameter, trephined the cornea, made a small radial incision, inserted the button and secured it with a stitch. Infection, iris and lens complications followed. After studying the physics of light he found a button 1½ lines in diameter would suffice, and it could be inserted thru a tiny incision. This method also was a failure, but the best results were obtanied where the least aqueous was lost; he controlled the iris with atropin and the the infection with antiseptic solutions.

In 1862 Abbate experimented on dogs and cats with artificial corneae. He used a glass disk 10 mm. in diameter, which had a gutta percha border, and external to this was a rim of casein, which was held in a scleral rim. He secured good union in seven days.

In 1872 Powers attempted the corneoplastic operation on a patient with a blind, painful glaucomatous eye. The transplant appeared to heal, but became cloudy and the pain again re-

turned, when the eye had to be enucleated, at which time the transplant fell out. Afterwards, he and Klein performed some experiments to determine whether the transplant would regrow on the same and different species and remain clear. He found the transplant remained more clear when the nictitating membrane and lids were stitched for a week. At that time, the piece was white and the parts were mucopurulent. The size of the transplant was 3/8 inch in diameter, and out of the series three dogs and three cats were failures, and of the rabbits only one was alive six weeks after the operation. The transplants healed but became opaque. Powers also operated on two children; in one the transplant became opaque, the other remained tolerably clear.

In 1876 Gradenigo operated on a patient with a leucomatous cornea, using a transplant from a young dog which included some conjunctiva; the healing was uninterrupted, the transplant clouded, but the vision was improved.

In 1877 Durr experimented on 20 animals, making rectangular flaps 12x 6x1 mm., and made the resection on the animals to be experimented on a little smaller. He found flaps which extended to the periphery and included some conjunctiva healed better. The transplants and lids were sutured. Union was complete in two days and the sutures removed. First there was a marked superficial hyperemia followed by an infiltration from the deeper vessels into the substance of the transplant, which caused it to swell and become yellow. This discoloration gradually disappeared, until at the end of six weeks the transplant was clear except at the periphery. He also operated on six patients with leucomatous eyes and obtained some improvement of vision. Thus he developed a good partial keratoplastic operation.

In 1877 Schoeller operated on 11 animals with partial or complete leucomatous eyes, and all healed. The transplants were 5x9 mm. and included some conjunctiva; the transplants and lids were sutured. After a period of from one to several months the transplants became opaque. He operated on a young man 20 years of age who had a soft leucomatous eye with only light perception. Immediately after the operation the borders of the transplant clouded, the stitches became loose, iritis set in, the pupillary space filled and the center of the transplant developed an ulcer which became vascularized. In six weeks the eye was quiet, but the center of the transplant remained opaque, and the patient counted fingers at 1 foot.

In 1877 A. von Hippel, after noting the failure of artificial corneae in the human eye, became encouraged by the fact that they remained in rabbit's eyes for one or more years. He decided that the artificial corneae in use were too shallow in the center, and he constructed one with a gold rim which could be taken out and cleaned. Under general anesthesia the cornea was trephined, an incision made, stitches inserted, the artificial cornea put in place with forceps and the stitches tied. The first three cases operated on were temporary successes, but the artificial cornea had to be taken out frequently and cleaned, and the final fate was a loss of vision following the extrusion of the glass by heavy lifting or the patients attempting to remove them themselves. Finding this field limited he turned to corneal transplantation. First he used Mattier's trephine, but this was unsatisfactory, so he designed the von Hippel trephine, which can be kept under more perfect control. First he trephined the patient's cornea, then he removed a similar piece from a dog's cornea, put it in place and fastened it. Being thicker it projected somewhat and its borders soon clouded, which he felt was due to lack of nourishment; so he employed counter irritation, but this made it worse. The patient saw a candle at 20 feet. Of three other patients operated on, the transplants remained clear for three weeks and the patients counted fingers.

In 1879 Wolfe did a transplantation on a patient, forty years of age, who had an opaque cornea. He removed a horizontal band of corneal tissue with conjunctival flaps on either end and replaced it with a similar clear

one. The union was by first intention and the patient could count fingers and tell features in two weeks.

In 1880 Zehender had a child with a large staphylomatous eye which he intended to enucleate, but on which previous to the enucleation a transplantation was done, using a dog's cornea. There was considerable loss of vitreous. For the first three days the graft remained clear, then panophthalmitis developed.

In 1881 Cienfuegos did three transplantations; the first was a leucomatous cornea with adhesions. He used a graft from a rabbit's cornea and the eye progressed normally for the first three weeks then panophthalmitis developed. The second case in which the operation was attempted, there was such an extensive loss of vitreous that the eye was lost. The third case was a child on whom a human cornea was transplanted with good results. The patient counted fingers at one meter.

In 1887 Adamiuk did a peritomy several mm. back of the rat's cornea, then applied the trephine, removed the entire tissue, inserted sutures, then placed it in a normal saline solution. Next the leucomatous eye was trephined, the transplant stitched in place and dressed as for cataract. On the third day he dressed the eye and found intraocular tension too great for so thin a transplant. Other complications developed and the eye was lost. He then decided to use stronger tissues and experimented with chicken's eyes. He operated on five more cases with unsatisfactory results.

In 1887 von Hippel reported that he operated on four cases within the past three years. He removed a disk of cornea 4 mm. in diameter, which extended down to Descemet's membrane, and replaced it with transplant from a dog's cornea 1 mm. thick. Three cases so operated on showed opaque transplants within four weeks. He decided this was due to traumatic keratitis. The fourth case was a girl seventeen years of age with diffused leucoma, able to count fingers at 2 M. In this case he transplanted the entire thickness of a rabbit's cornea and secured good results. Vision two weeks after the operation was 20/200. Eight months later there was an epithelial haze, but vision remained the same. Nineteen months after the operation, vision was still 20/200. In June 1887, he operated on a patient, fifty years old, whose vision was fingers at 3 M. Hemorrhage prolonged the operation, but the final results were good and vision was 1/10.

The technic of von Hippel's operation is as follows: First a clean cut disk is made and the hemorrhage controlled, second the disk is carefully removed with forceps and a Graefe knife, leaving opaque spots on Descemet's membrane alone. Third a disk the entire thickness of a rabbit's cornea is removed; fourth the disk must be placed in a dry bed and in absolute contact. If the disk is too thin healing will take place, but if too thick it is likely to be pushed out of place. The eye is dusted with iodoform, the lids carefully closed and bandaged. If on the sixth day everything looks normal, the bandage is discontinued and the patient let out of bed.

In 1888 W. F. Smith operated on a patient by the von Hippel method. The transplant was somewhat elevated, but appeared to unite in one week. Six months after the operation the patient could do ordinary house work.

In 1888 Fox operated on a patient with a leucomatous cornea, also by the von Hippel method. Healing was uninterrupted and in three months the patient counted fingers at four feet. The graft was slightly hazy.

In 1888 Chisolm operated on a patient by the von Hippel method. Within five days 3/4 of the graft was united, but it became cloudy and the patient was able to distinguish shadows. The other eye was also leucomatous, and he operated on it later and secured the same results.

Dimmer's experiments in corneoplasty were unsuccessful, so in 1889 he turned his attention to artificial corneas. He believed that the material used must be light and flexible, and hit upon celluloid to fill the requirements. The only precaution necessary was that the patient must not drink colored solutions, as celluloid had an affinity for them. He made small

celluloid corneas in the form of small hoods, with a brim. These he inserted into a trephine opening of the rabbit's cornea and secured them with sutures. After a few days a web formed back of them but soon the fundus could be seen with the ophthalmoscope. After two months, he enucleated the eyes and found that a membrane grew around the brim; he operated on three patients, using the same technic; two healed and the third, which did not fit well from the beginning, had to be removed in three weeks. The other two, because of high intraocular tension, were complicated with hemorrhage and blindness, also after four months with the formation of a membrane at the level of the brim. Müller modified Dimmer's operation by making a carrier for the hood, which he introduced into the anterior chamber thru an incision, and then trephined over it. Most of his cases did not heal well because of the restlessness of the patients. However, some counted fingers at 2½ meters. Glasses did not improve vision.

In 1891 von Hippel operated on a patient with a stained cornea by his method. First the transplant clouded but later it cleared. Healing was completed by the nineteenth day, and some stains could still be seen in Descemet's membrane.

In 1891 Silex operated on a patient with a leucomatous cornea by the von Hippel method and secured good results. Vision before the operation was 1/48 and after the operation 1/18. The transplant became hazy. He performed the operation nine times on patients suffering from the following conditions: interstitial keratitis, leucoma simplex and adherent, maculated cornea and old trachomatous pannus.

In 1893 Fröhlich operated on a patient 30 years of age who had an opaque staphylomatous cornea and counted fingers at 3 feet. He used the von Hippel method, and the transplant became opaque, except a small area down and out thru which the patient counted fingers. There was a moderate inflammatory reaction. He operated on five more patients by the same method, in none of whom pressure symptoms were present, but in all of whom the grafts underwent vascularization and became opaque.

In 1894 Schirmer operated on a patient with a leucomatous cornea complicated with pterygium. Under general anesthesia the pterygium was first operated on, and a section removed from the leucomatous cornea, which was replaced by graft from a rabbit's eye with a conjunctival flap. The edges of the flap were tucked under the conjunctiva, the eye dusted with iodoform and bandaged. The graft first became opaque, but after four months the upper 2/3 had cleared so that the patient's vision was 1/2. He stated that Teal attempted to correct opacities by transplanting conjunctiva, and Eversbush and Klein by transplanting skin.

In 1894 Fuchs reported two total keratoplastic operations with good visual results and thought this method was superior to von Hippel's, which was limited to certain cases only. He also did thirty total keratoplastic operations on all types of corneas; in fourteen cases he employed rabbit's cornea, in 11 he used cornea from enucleated human eyes, and in the remaining five he used grafts from dogs and stillborn infants. In 11 cases the cornea did not heal on account of the following causes: unequal thickness of the cornea, poor fitting flap, intraocular tension, and restlessness in children under ten years of age. He freed the iris in all his cases and has performed the operation on over 75 patients.

In 1894 Vollaro experimented on rabbits; first he removed a disc of cornea, then he split the corneal stroma around the border, making a pocket into which the edge of the graft was tucked. He secured union by first intention.

In 1895 Salzer experimented on rabbits with artificial cornea, and used as his material Berg crystal disk 4 to 5 mm. in diameter and 1/2 mm. thick, surrounded by a platinum rim with a perforated feather edge. A section like for cataract was made, the artificial cornea was inserted into the anterior chamber with a forceps and pressed against the posterior surface of the cornea where it adhered; next he

trephined over it and removed the leucomatous cornea, after which a peritomy was done, and the loosened conjunctiva stitched so as to close the corneal opening. One rabbit carried the prothesis seven months and had vision.

In 1897 Le Mond operated on a leucomatous cornea, removing 3/5 of it, and replaced it with a graft from a rabbit's cornea. Both the graft and the lids were sutured. The eye was dressed on the third and fifth day, removing the stitches on the fifth; the final result was that the patient with the aid of a glass counted fingers and was able to get about satisfactorily.

In 1903 Proeller reported that he had performed 15 corneoplastic operations and obtained good unions in all except two cases. The best visual results were fingers at 2 meters.

In 1906 Zirm operated on a patient, 45 years of age, with a leucomatous eye, on whom he transplanted a total graft from the eye of an eleven year old boy. This graft was 5 mm. in diameter, cut out with the von Hippel trephine, placed in warm saline solution, then put in place without instrumentation. To safeguard against high tension, he placed two sutures in the conjunctiva at right angles to each other, so that they crossed at the center of the graft. The graft remained transparent, and approximately one year after the operation the patient had good vision.

In 1907 Pandelescue and Gomoni did partial corneoplastic experiments on dogs. One half the thickness of the cornea with a conjunctival rim was removed and placed on another dog's eye similarly treated, and then the lids were sutured. The transplants generally remained clear.

In 1907 O'Meara reported partial keratoplasties, in which he cut off the outer portions of the leucomas and placed dog's corneas over them and secured them with four sutures. He claims his results showed visual and cosmetic improvement.

In 1908 Calderaro reported a partial keratoplasty on a woman, 66 years old, who had a corneal tumor. A 6 mm. disk was cut out with a trephine and in its bed was placed a full thickness human graft, which was held in place for 15 minutes; then the eye was bandaged. The graft remained clear and vision was 1/20.

In 1908 Plange operated on a leucomatous eye which was complicated by perforation and iris prolapse. He removed the opaque tissue until he secured a clear floor, then from the same patient's opposite eye, which was in a state of phthisis bulbi, he cut a section of the cornea with a conjunctival flap and sutured it in place. Four weeks after the operation he counted fingers at 5 meters.

In 1908 Circincione operated on a patient who had an epithelioma of the cornea; he used the von Hippel method and engrafted the entire thickness of a child's cornea. Five months after the operation vision was 1/10.

In 1908 Lesser did a partial keratoplasty, and used as his transplant the entire thickness of a rabbit's cornea. He secured good union, and three months later the patient counted fingers at 1 foot.

In 1912 Morax performed a keratoplasty by transposition of the graft. He removed the cicatricial tissue from the center of the cornea and in its place he swung a graft from the periphery of the same cornea.

In 1913 von Haselberg transplanted a disk of a human cornea, 1/2 mm. thick and 5 mm. in diameter, on an opaque cornea, and secured it with sutures. The graft, which was first opaque, later cleared, so that one year after the operation vision was 1/60 and the patient was able to go about alone.

In 1913 Frieberg operated on a patient to remove a cicatricial pterygium; later the cornea became cicitracized, and he engrafted a human cornea upon it. Immediately after the operation the graft clouded, but cleared so on the fifth day the patient's vision was 4/10. Two weeks after the operation a violent keratitis developed, and the graft became opaque. This result he believed to be due to anaphylactic action.

In 1917 Martin had a patient with a leucomatous eye plus other complications; he transplanted a human cornea using the following technic: First

he injected normal salt solution into the subconjunctival space, then freed the conjunctiva at the limbus and inserted several sutures; next he removed an 8 mm. disk of opaque cornea and inserted a clear graft, after which he tied the sutures so that the conjunctiva covered the graft. The graft became opaque, and one year after the operation vision was light perception.

In 1920 Burke reported two cases of homotransplantation. The first patient was 36 years old, whose eye became leucomatous from an ammonia burn in 1923. The technic was as follows: a peritomy was performed 3 mm. back of the limbus, and the conjunctiva dissected up to the cornea; after which the entire thickness of the cornea was removed and placed in normal salt solution; next it was placed on the eye to be engrafted, which had been similarly treated and secured with 20 to 24 interrupted sutures. Healing was satisfactory. The patient was not seen for several years, until 1920, when the eye had to be removed for secondary glaucoma. The patient stated that vision gradually improved until 1919, and that he could see an arc light five blocks away.

The second case was operated on in 1915 with a similar technic. The patient had had an iridectomy previously, and during the present operation the lens and some vitreous were lost. The patient left the hospital four weeks after the operation with a soft eye. In 1920 the tension was full, the cornea fibrous and vascular with some calcareous infiltration.

In 1921 Ebeling and Carrel reported some experimental results on cats, which had been operated on two years previously for total transplantation of the cornea. Out of the group, they secured one transplant graft which has now remained clear for two years. They used only sterile eyes, made a safedoor like graft, immersed it in sterile oil and stitched it with sutures sterilized in oil. The sutures did not enter the anterior chamber.

The following *complications* have been reported: Nussbaum: iritis, small ulcers, abscesses, early clouding, which was more marked in animals than in human beings. Schoeller, that the interpupillary space filled in. Adamiuk, suppuration, and that inflammation was kept up by bony exfoliations from the chicken's sclera. Von Hippel: if the bed of the excised portion is perforated and the aqueous lost, the operation must be discontinued but may be repeated in from four to six weeks; if the disk has been cut obliquely, stop the operation and allow it to heal; if the trephine has been placed on the cornea too lightly, the disk will be cut irregularly, if pressed upon too heavily, the cornea will be perforated; if a tiny perforation exists the operation may be completed. The floor must be level, and if hemorrhage occurs under the transplant, it must be removed, the bed dried and the transplant replaced; if the intraocular tension is too high and the cornea bulges, the anterior chamber must be punctured at once. Dimmer: blindness, fistulas, hemorrhage, retinal detachment and membrane formation.

Pathologic histology: Nussbaum found that connective tissue developed around the glass button, and that the corneal stroma around this region became wavy. Power's sections showed vascular loops, connective tissue union of graft, irregularity of epithelium, young connective tissue cells and some polynuclear cells. Neelson and Angelucci found connective tissue formation at the sides and bottom of the graft, the epithelium was not of uniform thickness, the stroma wavy and the endothelium absent in places; some grafts were clear but had a membrane formed back of them. Vollaro killed his animals at intervals ranging from 1 1/2 to 40 days. He found a proliferation of the epithelium both of the graft and the adjoining corneal border; there was no degeneration of the corneal corpuscles, but they were fewer in number along the line of union. The epithelium which grew into the pocket of the corneal stroma showed partial vacuolization, atrophy and absorption within one week, and a complete atrophy and absorption within 40 days.

Discussions.—Schoeller stated, that his case demonstrated that the opacity in transplant preceded vascularization. Adamiuk said that partial transplants

were of value only where the opacity did not extend beyond Descemet's membrane, and he believed the limbus should be included in the transplant. Wagenmann stated that in lacerated wounds, where the endothelium was lacerated and rolled back, it again united and became clear; that in the clean cut wounds it united by first intention, that he secured two clear grafts out of seven by pushing the graft right back into place again, and he believed this method gave the best results. Frölich thought that a clear floor and graft were more essential than perfect trephining. Schweigger claimed that the opacity was due to vascularization. Von Hippel said it was due to poor technic and crushing of the tissues. Fuchs said the best unions were those cases in which vascularization occurred, that his grafts remained clear for four days on an average, and in one instance in which it remained clear fourteen days the graft became displaced in six months. This proved that its union was only fibrinous and that its nourishment was thru osmosis. His best visual results were in parenchymatous cases, some of which did coarse work 1 1/2 years after the operation. In 12 cases of dense flat leucoma, the graft remained clear in 2 only; in 8 cases of total staphyloma, the graft remained clear in one only for 30 days; in 8 cases of partial staphyloma, the graft remained flat in 5; in total leucomas vision can be restored in only a small percentage of cases. Salzer stated that animal tissues react differently than human, that the tension in the rabbit's eye could be disregarded, that he would not recommend his operation except in cases of bilateral involvement.

In 1918 Bonnefon reported that he experimented on animals for six years, and he found that microscopically the graft regenerated itself except the epithelium, and that a graft placed on cicatricial tissue regenerated slowly. He said that all grafting must be based on the elementary biologic laws which govern regeneration.

Conclusions. — Feldmann concluded that a foreign transplant could be healed by first or second intention, that it gradually became opaque and smaller when healed. Durr said that peripheral transplants were the best, that a rabbit's cornea could be healed on the human, and after it had completely healed that graft partially cleared up. Adamiuk believed that the scleral border must be included in the transplant, and the graft must be strong enough to withstand intraocular tension. Von Hippel stated that total adherent and bulging leucomas were inoperable by his method, that vision is improved and the operation safe for the patients; Dimmer contended celluloid could be healed in a leucomatous cornea without membrane formation, but that the final results were uncertain. Frölich claimed that absolute opacities in Descemet's membrane remained, that vascularization could be controlled by the galvanocautery point, and that a clear floor and graft were necessary for optical results. Ebeling and Carrel concluded that a transplant can be healed in the same plane with the cornea and remain transparent.

EXPERIMENTS IN CORNEOPLASTY.

BY A. E. FORSTER AND C. R. BRIDGETT.

TECHNIC.—In our general experiments, the operators, instruments and animals were prepared as for any operative procedure on the human. The eye was fixed with several hemostats fastened to the conjunctiva, and an equilateral triangle of 7 or 8 mm. was outlined on the cornea with a small pointed forceps; the entire thickness of the triangular area was cut out, placed in sterile oil and with its angles transposed it was again replaced and stitched. The stitches placed at each angle were also sterilized in oil, and penetrated all the layers of the cornea and flap. The flap was transposed with the idea that if a macula existed in one portion of it, it could be so moved that clear appeared along the visual line. The eyes or conjunctival sacs were not irrigated with any antiseptic solution preceding or following the operation. Nor were any sutures placed in the nictitating membrane or lids. The lids normally seemed to remain closed for the first two or three days after the operation, then they would be semiopened for approximately a

week longer. In some cases there was a little mucoid discharge; in others there was only a dark mass of hardened secretion at the inner canthus. We first tried to secure sterile eyes for the experiments, but as there was not sufficient material at hand, we simply selected cats which appeared to have normal eyes.

The following cats were operated on by the preceding technic:

Cat No. 1, operated on March 6th; March 8th the eye was still closed, no swelling or discharge; March 10th lids semiopened and the anterior chamber formed; March 13th eye quiet, nictitating membrane slightly congested, lower half of the flap clouded; March 17th condition about the same; March 20th flap appeared healed, the eye quiet, clouding the same. March 24th removed two sutures, eye conditions the same; March 31st haziness of the flap about the same and several thread like anterior synechia which were black from the proliferation of the pigment epithelium of the iris. June 8th the flap was found to be healed in the same plane with the cornea, and clear, except a few ray like infiltrations.

No. 2 was operated on March 8th; March 10th lids closed, no swelling or discharge, anterior chamber formed; March 13th flap cleared, except a little haze at the lower border, nictitating membrane slightly edematous; March 17th conditions about the same; March 20th flap appeared healed, some haziness about the border and some mucus at the internal canthus; March 22nd flap healed; removed two stitches which were loose; small opacity 2x3 mm. equally divided between the cornea and flap; March 24th eye the same; June 8th eye normal, flap in the same plane with the cornea and clear, except a small amount of pigment down and in from iris contact.

No. 3 operated on March 17th. March 20th lids normal and semiopened, flap clear, anterior chamber normal; March 22nd conditions the same; eye quiet, except a small nodule on the outer side of the globe near the limbus where the nictitating membrane had been adherent; March 24th eye the same; March 27th eye quiet, flap clear; March 31st small nodule about disappeared, flap clear, except a slight epithelial haze; June 8th flap healed in same plane with the cornea and clear, except a small pigmented area down and out. No. 3 was the most satisfactory of the entire group.

No. 4 operated on March 29th; March 31st lids swollen and some discharge; April 3rd flap opaque and eye somewhat injected; April 10th flap entirely opaque; June 8th eye quiet, flap remained opaque and somewhat staphylomatous.

No. 5 operated on April 19th; April 21st lids closed, no swelling; April 24th slight discharge, flap slightly hazy; April 28th slight discharge, no swelling, eye quiet; May 1st flap appeared healed, haziness about the same; May 8th condition the same; June 8th flap clear, except small hazy area in the center, healing took place in the same plane with the cornea, but the curvature was slightly exaggerated.

No. 6 operated on April 21st; April 24th lids semiopen and lower third of flap clouded; April 28th eye quiet and flap the same, except a tiny synechia at the center; May 1st flap healed, haziness the same; May 8th conditions the same; June 8th flap clear, except a small dark area in the center, the result of a former synechia.

Fundus details can be made out with the ophthalmoscope in all cases, except No. 4.

CONCLUSIONS.

From our review of the literature and from the consideration of our own results, we feel that we are justified in concluding that a flap of the entire thickness can be removed and replaced with an entirely satisfactory result. We believe that a transplantation from another species is a biologic impossibility; whether transplants can be made within this species is not yet decided. The essentials to success is rigid adherence to the principles of modern surgery, and we have the impression that the use of oil, as advocated by Ebeling and Carrel, is of value; but whether in some specific way, as by preventing the aqueous

humor from gaining entrance to the tissue spaces, and exerting the harmful effect which has been attributed to it, or whether because the oil constitutes an absolutely indifferent medium producing no effects because of changes in tonicity or hydrogenion content, is not so clear.

We wish to express our appreciation for the assistance afforded us by the Department of Surgical Research of the University of Pennsylvania.

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AN EXPERIMENTAL STUDY OF THE PATHOGENESIS OF QUININ AMBLYOPIA WITH SPECIAL REFERENCE TO ETHYLHYDROCUPREIN HYDROCHLORID.

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The work of other experimenters on this subject, previously published, is here reviewed, showing the toxic action of quinin is first shown in the ganglion cells of the retina and followed by degenerative changes in the optic nerve. The writer's experiments on rabbits with quinin and urea hydrochlorid and ethylhydrocuprein hydrochlorid are then reported. Only slight retinal lesions were produced even in rabbits receiving fatal doses. Experiments were made in the laboratory of Prof. Kollmer at the University of Pennsylvania. Paper read after author's death before the Section on Ophthalmology of the Philadelphia College of Physicians, Oct. 19, 1922. (See p. 236.)

Previous experiments with quinin have definitely proved that amblyopia can be established whenever the proper toxic dose is administered. This amblyopia is attended with certain definite symptoms and ophthalmoscopic changes. Of the former, there is a fixed and dilated pupil, anesthesia of the cornea, tinnitus, temporary deafness; and a blindness which is usually established quite suddenly and completely, and which continues for indefinite periods in moderate intoxications, to be followed by a return of central vision. The fields are concentrically contracted, or in the form of a horizontal ellipse, while the severe cases are attended with atrophy of the optic nerve. In the latter, ophthalmoscopic changes are found; ischemia of the retina due to constriction of the central retinal artery; a paling of the disc, with clear or occasionally blurred margins, and more rarely a thrombosis of the central artery and a cherry red spot in the macular region.

The *purpose of the experiments* described in this paper were to determine the amount of ethylhydrocuprein hydrochlorid and other quinin compounds required to produce this toxic amblyopia, and to study histologically the pathogenesis of the condition.

A *review of the literature* of experimental quinin amblyopia disclosed the following interesting data regarding its pathologic histology: de Bono,[1-2] in his early experiments on frogs, found changes in the retinal or choroidal vessels; also that there was a lack of normal movement of the pigment molecules within the pigment epithelium. It is likely he killed his animals before degenerative changes occurred. In a later experiment on dogs, he reported that in an animal killed two hours after an injection of a toxic dose which produced amaurosis, no cellular changes were found. On the fourth day after the injection, only slight changes were seen in the ganglion cells of the retina, which showed a slight disorganization of the granules; at the same time there was no change in the pyramidal cells in the brain, but the ganglion cells in the same structure showed marked alteration, consisting of a separation of the granules, with the nuclei pushed to the periphery. He found some atrophy of the protoplasm of the ganglion cells in the brain, but the optic nerve was negative.

De Schweinitz[3-4] discovered, that from the first to the fourth week of blindness, there was found in the optic ne[illegible]an imperfect differentiation of its [illegible]ous trabeculae, and a separation of [illegible] individual fibrils, which were beaded and showed beginning atrophy. At this period there was no evidence of neuritis or vascular changes. After the second or third month of blindness, there was an extensive amount of connective tissue formed in the optic nerve and the atrophy was nearly complete. The nutrient vessels of the nerve were thickened, the perivascular lymph spaces were dilated and occasionally, on account of endovasculitis, a clot appeared in the central vessel in the process of organization. This atrophy was traced thru the nerve, chiasm and tracts. In contrast, the ciliary and oculomotor nerves were normal, with only slight changes noted in the lenticular ganglion.

Holden[5-6] found, that an animal rendered amblyopic by receiving three toxic injections, and killed on the third day, exhibited retinal changes as follows: the ganglion cells showed vacuolization, the chromophilic granules stained poorly, the nucleus was pushed to the periphery, and some of the cell bodies were beginning to break down. Granular and homogeneous gobules resembling myelin were found in the nerve fiber layer, which stained with eosin but not with osmic acid. These globules may be a precipitated albuminous fluid, or due to the fixing solution. An animal killed after nine days of amblyopia showed an increased degeneration of the ganglion cells, but the optic nerve was normal. In one killed on the seventeenth day, only the nuclei remained of some of the ganglion cells and the myelin globules were seen farther from the disc. Marchi's stain showed a degeneration of the myelin sheath. One killed on the forty-second day showed almost an absence of the ganglion cells, the myelin globules and the nerve fiber layer. The degeneration of the myelin sheath could be traced thru the tract to the external geniculate body and the pulvinar of the thalamus. The ganglion cells of the external and internal geniculate bodies and the cord remained normal. One killed on the forty-sixth day showed no new changes, nor at any time were any of the vessels involved.

Druault[7] found a rapid degeneration, first of the protoplasm of the ganglion cells, then of the nuclei. The latter first took on an intensified and later a diminished stain; this was followed by the breaking up of the nucleus and nucleolus. At this time, staining with Misl's method was negative, but the hyalin which replaced it stained with eosin. Degeneration took place as early as five hours after the first injection; in ten hours it was more advanced, and in seventeen hours almost all the ganglion cells had disappeared. The foveal region, even in severe cases, seemed little involved. The nuclei of the internal granular layer first stained more highly; later they appeared less numerous than in the normal retina. The lesions were always alike in both eyes. The optic nerve showed Wallerian degeneration that developed later than the retinal lesion, appearing about the third day. On the seventh day the degeneration of the nerve was well advanced.

Birch-Hirschfeld,[8] in his experiments, found the ganglion cells of the retina to be shrunken, and the protoplasm took a deeper stain than normal. Changes occurred in the nucleus and chromatin bodies, while the rods and cones and the inner and outer granular layer showed degenerative changes, least marked in the outer. Vessels were negative. The same author, by surgically cutting off the retinal blood supply, found changes similar to those in the quinin poisoned animals. The cell vacuolization was greater, and the cells and their nuclei were more shrunken, otherwise the conditions were the same.

EXPERIMENTAL PART.

Our experimental work was conducted in Prof. Kolmer's laboratory, on white rabbits. Two groups, one of six and another of four, were used. The work on the first group was begun Jan. 19, 1922, and continued tri-weekly until April 24, 1922. The following technic was employed: the rabbits were weighed each time and received .010 gm. per kilo of the drugs by intravenous injection; .020 gm. per kilo by subcutaneous injection; .040 gm. per kilo by internal administration. Nos. 1, 3 and 5 received quinin and urea hydrochlorid. Nos. 2, 4 and 6 received ethylhydrocuprein hydrochlorid. The drugs were freshly prepared each time, being dissolved in sterile normal salt solution; the syringe and needles were sterilized before each treatment, and the points of injection cleansed with alcohol. The average weight of each rabbit was approximately 2 kilos. After the death of animals, necropsy was performed and histologic examination made of eyes, optic nerve, tracts and brain.

At each treatment they were tested as to their vision and for corneal anesthesia, following which the eyes were examined in the dark room, and discs,

retinal vessels, fundi and pupil noted. The weight of the rabbits from Jan. 12 to April 1st was fairly constant, with a fluctuation of from 50 to 150 grms. The only exception was rabbit No. 5, which suffered from a cold and died March 28th and was necropsied. During the above period, the rabbits all appeared to be in normal condition, with the exception of No. 5.

Results.—After April 1st there was a marked loss in weight, so that the standard was from 300 to 700 gm. below the original kilos, with a fluctuation similar to the former.

Rabbit No. 1 received 41 intravenous injections of .010 gm., or a total of 4.1 dg. Ophthalmoscopic examinations were negative thruout. It died April 23rd but was not necropsied.

Rabbit No. 2 received 42 doses of .010 gm. each, or a total of 4. dg. He was chloroformed April 24th and necropsied. Ophthalmoscopic examinations were negative. Histologically, the cerebrum showed a well marked perivascular infiltration of mononuclears and plasma cells, with an excess of the former. There were also a few scattered nodes resembling epithelial cells, which were surrounded by mononuclears. The perivascular infiltration was much less marked in the cerebellum and pons. No changes noted in the pyramidal or ganglion cells, optic tract or nerves. In the eyes there were changes in the ganglion layer. The great majority of nuclei stained well, some showed a lack of nuclear outlines, with the breaking up of the chromatin into small vessels and their extrusion. These masses stained more faintly; vacuoles were found in the protoplasm and nuclei of some cells.

Rabbit No. 3 received 37 doses of .020 gm. each, or a total of 4.2 dg. He suffered a cold and died April 13th, was placed on ice within an hour and necropsied several hours later. Ophthalmoscopic examinations negative. Microscopically it showed similar changes to No. 2, only less marked.

Rabbit No. 4 received 42 doses of .020 gm. each, or a total of 8.4 dg. He was chloroformed April 24th and necropsied. Ophthalmoscopic examinations negative. Histologically, there was a perivascular round cell infiltration in the brain. No other changes were seen. The nuclei of the ganglion cell layer of the retina stained well, with some exceptions where the protoplasm was indistinct. Degenerative changes were less marked than in No. 3.

Rabbit No. 5 received 34 doses of .040 gm. each, or a total of 1.36 gm. He suffered from a cold, died March 28th and was necropsied. Ophthalmoscopic examinations negative. Histologically, the cerebrum, pons and medulla showed no perivascular infiltration or other changes. Some ganglion cells in the retina showed vacuolization of the protoplasm and a disappearance of some of the granules; in others the nucleus appeared swollen with a breaking up of its chromatin, while the nuclear wall remained intact. Numerous small bodies of variable size, which looked like hyalin masses, were seen in the nerve fiber layer.

Rabbit No. 6 received 42 doses of .040 gm. each, or a total of 1.68 gm. He was chloroformed April 24th and necropsied. Ophthalmoscopic examinations negative thruout. Histologically there were no changes in the cerebrum, medulla or pons. The ganglion cells in the retina appeared less numerous, and vacuoles were found in the protoplasm of many cells, otherwise the retina appeared normal.

Group No. 2.—March 2, 1922, the second group, Nos. 7, 8, 9 and 10, were started; they also weighed approximately 2 kilos.

Nos. 7 and 9 received .040 gm. per kilo of quinin and urea hydrochlorid subcutaneously. Nos. 8 and 10 received .080 gm. per kilo of ethylhydrocuprein hydrochlorid into the stomach. The technic was carried out precisely as in group No. 1.

March 29th, Nos. 8 and 10 received increased doses at hour intervals. No. 8 received .080 per kilo of ethylhydrocuprein hydrochlorid per stomach at 9:40, 10:40, 11:40 a. m and 12:40 p. m. Regular examinations were carried out hourly and were negative. At 4:00 p. m. symptoms of intoxication set in, and when the rabbit would

attempt to walk he would do so with uncertain gait and fall to one side. Fundus negative. At 6:00 p. m. he was so toxic that he could not stand, the pupils were widely dilated, and he paid no attention to any tests. Fundus examination negative. No. 8 died at 3:00 a. m, was placed on ice and necropsied.

No. 10 received .080 gm. per kilo of ethylhydrocuprein hydrochlorid at 9:45, 10:45, and 11:45 a. m. At 12:45 p. m. he showed marked signs of intoxication, staggered and occasionally fell on his stomach, and then moved his legs similar to a turtle swimming. At 4:00 p. m. he seemed a little weaker and pupils were a little larger. At 6:00 p. m. he was unable to walk and failed to respond to any tests. At 6:00 p. m. the fundus examination was still negative. He was found dead at 1:00 a. m. by the night watchman, placed on ice and necropsied. Clinically the ophthalmoscopic findings were negative thruout the experiment.

Rabbit No. 7 received 12 doses of .040 gm. each, or a total of 4.8 dg. He died March 28, was necropsied within 2 hours. Ophthalmoscopic examinations negative. Microscopically, there were no brain or optic nerve changes. Some bodies resembling hyalin were seen in the ganglion cell layer, with a vacuolization of some of the cellular protoplasm.

Rabbit No. 8 received 12 doses of .040 gm. each, and 4 doses of .080 gm. each, or a total of 8 dg. He died March 30th, was put on ice within an hour and necropsied soon after. Ophthalmoscopic examination negative. Microscopically, the brain showed a marked perivascular infiltration, most extensive in the cerebellum. The pyramidal cells showed some loss of Nissl granules, and some nuclei showed a loss of detail in structure. In the retina there was vacuolization of protoplasm and nuclei of the ganglion cells. Some of the cell outlines were indistinct and the nuclei stained more faintly.

Rabbit No. 9 received 4 doses of .080 gm. each, or a total of 3.2 dg. He died March 7th, was necropsied within 2 hours. Ophthalmoscopic examinations negative. The specimens were spoiled in the preparation.

Rabbit No. 10 received 17 doses of .080 gm. each, or a total of 1.36 gm. He died March 30th, was put on ice within an hour and necropsied several hours later. Ophthalmoscopic examinations negative. Microscopically, the perivascular infiltration of mononuclears was especially marked in the cerebrum; there were also a few scattered arears of mononuclear infiltration within the cerebral substance. There was a marked loss of chromatin in some of the nuclei of the pyramidal cells, and the cell wall was often indistinct. In the protoplasm and nuclei, also some hyalin bodies.

Normal Specimens.—The four normal eyes, including the optic nerves, tracts and brains, examined were negative, except in the ganglion layer of the retina, where there were an occasional vacuolated cell with a swollen nucleus and a few hyalin like granules.

Conclusions.—Rabbits were able to tolerate enormous doses of quinin and urea hydrochlorid and ethylhydrocuprein hydrochlorid, without showing any special signs of intoxication. The first group received 238 doses, or a total of 5.55 gm. within a period of three months. This tolerance was demonstrated by the fact that all rabbits, those receiving the largest as well as those receiving the smallest doses, apparently enjoyed the same health and retained their same approximate weights.

The second group received a much larger total amount within a comparatively short period; they received only 49 doses within four weeks, but a total of 2.96 gm. The reason for this increased amount was to establish the toxic dose, which appeared to be approximately .080 gm. per kilo given hourly for two to four doses.

It is noteworthy, that during the entire period of the experiments, not one of the rabbits ever exhibited any corneal anesthesia, dilatation of the pupils, ischemia of the retina or constriction of the retinal arteries, evidence of visual disturbance, or any other ophthalmoscopic changes in the

fundus. Microscopically, the first group showed perivascular infiltration of mononuclear and plasma cells in the cerebrum in three cases, and to a less degree in one case in the cerebellum. In all other cases, the pons, cerebellum and optic nerves were negative. In the retina, the ganglion cell layer in all cases showed marked changes, such as vacuolization of the cell, protoplasm and nuclei, the breaking up of the chromatin, the loss of the nuclear wall and the extrusion of its contents, the loss in staining properties, the decrease in the number of ganglion cells and the appearance of hyalin like bodies. The second group showed similar changes, with the exceptions of Rabbits Nos. 8 and 10, which received the toxic doses. These two also showed changes in the pyramidal cells of the brain, such as a marked loss of the chromatin in some nuclei, a decrease of Nissl granules and a partial or complete loss of cell outline. The fact that the cellular changes in the normal specimens were so inconsiderable leads us to believe that the changes found in the above experiments were due to the toxic influence of the drugs employed.

I wish to express my appreciation and thanks to Professor Kolmer for his valuable assistance and suggestions; also to Dr. Case, the pathologist, for his efficient assistance; and to Miss Arthur, the technician, for her services.

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OPHTHALMIA NEONATORUM.

LOUIS LEHRFELD, A.M., M.D.

PHILADELPHIA.

A study of statistical reports reveals certain new facts regarding ophthalmia neonatorum; which are made the basis of suggestions for its prevention of considerable general importance. Read before the Philadelphia County Medical Society, April 26, 1922.

It is very interesting to know, after years of experience in preventive medicine, just what accomplishments have been achieved by modern scientific methods, more especially in those fields where legislation has been enacted to curb the spread of disease and to minimize the damage caused by it. In the case of ophthalmia neonatorum, which is well recognized by the medical profession as a dangerous infection destructive to the eyesight, and even known to the more educated laity as a preventable and curable disease, statistics of recent years reveal new facts upon which may rest a more effective means of control.

In 1918, the Department of Public Health of Philadelphia conducted a survey of the cases reported the preceding year (1917), with the view of ascertaining if the law requiring such report was influential in reducing the number of blind cases among children, resulting from this infection. Seventy-one cases reported during 1917 were investigated. Of this number, reasonably accurate data were obtained from 49 cases; the remainder were not located, or the information was not satisfactory. Two cases resulted in complete blindness in both eyes, one in partial blindness of the right eye, two in disturbance of vision, as evidenced by small maculations in the left eye, and one of the same degree in both eyes.

END RESULTS OF CASES 1917.

Opacity of Cornea	Eyes Affected	No. of Cases Occuring
Slight—1/4 Surface	Both	1
	Left	2
Moderate—1/2 surface	Right	1
Extensive—3/4 or whole Surface	Both	2

The measure of degree of blindness was rather arbitrary, as the amount of corneal opacity was taken as the index of destruction of vision. Since these cases were observed by an experienced public health nurse, they may be considered as reasonably correct.

Further study of the 49 cases showed that six were really not ophthalmia neonatorum, since they occurred in persons at the ages of one year, two years, five years, eight years, nine years and twenty-five years. I cannot explain why the latter were reported by physicians as ophthalmia neonatorum. Bacteriologic examination showed that the gonococcus was present in 16 cases and negative in three; no smears for studies were made in the remaining cases. Forty-three cases occurred, however, during the first month, of which nineteen occurred during the first three days, eight on the fourth day, one on the fifth day, one on the sixth day, six on the seventh, and eight at various periods from the second to the fourth week.

DAY OF OCCURRENCE OF DISEASE (1917).

Cases.

At birth	7
Second day	4
Third day	8
Fourth day	8
Fifth day	1
Sixth day	1
Seventh day	6
Tenth day	2
Eleventh day	1
Twelfth day	1
Fourteenth day	1
Third week	2
First month	1
First year	1
Second year	1
Fifth year	1
Eighth year	1
Ninth year	1
Twenty-fifth year	1
Cases	49

Unknown cases	4
Total cases	53

STUDY OF 1919 AND 1920.

No analysis was made of the cases in 1918, but since that date, when venereal diseases other than ophthalmia neonatorum were made reportable, a more thoro study of each case has been made by the Medical Inspectors of the Bureau of Health.

During 1919, there were reported 60 cases, of which 27 were gonorrheal and 33 were negative or nongonorrheal. Those which were of positive Neisserian origin, are as follows:

Color.

White	17
Black	10

Sex.

Male	10
Female	17

Reported by

Physicians	6
Institutions	9
Nurses	9
Midwife	3

Eye Infected.

R.	8
L.	4
Both	13
Not stated	2

Incubation in days.

1	7
2	8
3	3
4	3
5	3
13	2
Not stated	1

Birth attended by

Physician	21
Midwife	6

Prophylactic.

Used	20
Not used	7

STATISTICS 1920

During 1920 there were reported 82 cases, of which 35 were positive for the gonococcus and 47 were nongonorrheal. The following is a compilation of the total cases:

	Gon.	Nongon.
Color.		
White	21	31
Black	14	16
Sex.		
Male	18	21
Female	17	26
Reported by		
Physician	16	11
Hospital	7	2
Visiting Nurse	9	33
Institution	3	1
Midwife	0	0
Anonymous	0	0
Eyes Infected.		
R.	7	12
L.	6	3
Both	22	32
Births.		
	Gon.	Nongon.
Physician	32	40
Midwife	3	7
Smears.		
Positive	35	
Negative		47
Treatment.		
Hospital	5	9
Home	22	46
Incubation in days.		
	Gon	Nongon.
1	5	9
2	6	5
3	5	4
4	9	5
5	4	3
6	2	2
7	1	3
8	2	6
9	0	1
10	0	3
11	1	2
Over 11	0	4
Prophylactic		
Used	20	19
Silver	16	16
Argyrol	4	3
Unspecified	2	
None used	13	18
Source of Infection.		
Birth Canal	27	0
Mother	0	4
Nurse	0	0
Patient	0	1
Other persons	0	0
Irritants	0	18
Undetermined	8	24

DEDUCTION OF STATISTICS.

Incubation Period: The text books state that the average incubation period of ophthalmia neonatorum is three days. Fuchs claims it is rarely 4 or 5 days, and that cases occurring after this time are infections from soiled linens, hands of the nurse or mother. It is true that a large proportion of cases occur during the first three days, but there is positive evidence that the incubation of primary infections may be two weeks and rarely one month. This may be accounted for by the fact that the use of a prophylactic may inhibit the growth of organisms, or the gonococcus in the genitals of the mother may be of low virulence. If these late cases of ophthalmia neonatorum were secondary, caused by infection from hands and linens, why is it that gonorrheal ophthalmia in the nursing mother practically never occurs? Why should the baby's eyes be the choice of its development after delivery? It is reasonable to believe that secondary cases of infection may occur, more especially in the institutions for foundlings, where the disease may spread from one child to another by faulty nursing technic, but I am firmly convinced that ophthalmia neonatorum is essentially an infection from the birth canal.

The use of strong solutions of silver nitrat, say 2% or even 1% is always attended by a more or less inflammation of the lids and conjunctiva, which may mask the symptoms of an oncoming true ophthalmia, or may be mistaken by the nurse or physician as a sign of infection. Since only a scant majority of cases occur during the first three days, it is essential that the prophylaxis be such as to combat the late cases. I, therefore, suggest as a health measure the *use of a prophylactic milder in character than silver, and one which can be used over a period of at least three successive days.* The use of one instillation of any medicine gives a false sense of security and safety. This is the case with the Credé Method, which is quite effectual with the nongonorrheal infections, but is not as positive in its effect in the true Neisserian cases.

Furthermore, thoroness is mose assurred in reaching all organisms if the toilet of the eyes be practiced on several occasions rather than once.

It was commonly believed by health officials that ophthalmia neonatorum occurred largely in the practice of midwives. In this City, it is significant to note that 32 of 35 positive cases reported last year occurred in babies delivered by physicians, and 3 by *midwives*. A more startling fact is that a prophylactic was used in only 20 instances. If such omission occurs among the actual gonorrheal cases, there must necessarily be a large number of the 43,000 babies born in this city who do not receive this all important prophylactic treatment. The physician who fails to use this recognized preventative is certainly guilty of negligence.

BLINDNESS RESULTING FROM OPHTHALMIA NEONATORUM.

The number of cases of ophthalmia neonatorum recorded in this city since 1913, when the disease was made reportable, is as follows:

1913	1
1914	54
1915	44
1916	45
1917	72
1918	49
1919	60
1920	82

These do not really represent all the cases of ophthalmia neonatorum occurring in the city, since many are unreported, and often no knowledge is gained of the existence of the disease until it results in blindness or partial blindness, when it is recorded as the child approaches school age. The law of compulsory education requires all children, including the blind, to receive an education. The records of the schools for the blind, and the special classes in the public schools, reveal more accurate data, at least as to the damaging results of ophthalmia, with an inkling as to its prevalence.

A Report from the Pennsylvania Institute for the Blind, Overbrook, Philadelphia, is as follows:

	Pupils Admitted	Ophthalmia Neonatorum	
1892	41	9	22%
1893	30	7	23%
1894	27	5	18%
1895	39	10	25%
1896	30	6	20%
1897	32	3	9%
1898	23	7	30%
1899	29	9	31%
1900	25	11	44%
1901	28	10	35%
1902	39	9	23%
1903	50	14	28%
1904	58	15	25%
1905	42	21	50%
1906	38	12	31%
1907	34	9	26%
1908	29	11	37%
1909	34	15	44%
1910	32	12	37%
1911	(8 mos.) 10	2	20%
1912	36	8	22%
1913	19	5	26%
1914	32	8	25%
1915	26	6	23%
1916	35	3	8%
1917	32	10	31%
1918	39	12	30%
1919	41	5	12%
1920	46	17	37%
1921	(Nov. 22) 44	6	13%

During a period of 30 years, 1020 cases were admitted to the school, of which 267 were cases arising from ophthalmia neonatorum, or 26 per cent. of the total. The yearly percentages varied from 8 per cent. to 50 per cent., and during the first 10 year period, from 1892 to 1901, the per cent. was 25, during the 2nd period, 1902 to 1911, the percentage was 32, and the last decennial period, 1912 to 1921, the percentage was 23. These figures show that there has been no appreciable decrease in the admission rate from ophthalmia neonatorum. The immediate conjecture would be that blindness has not been seriously held in check or prevented by the present methods of prophylactic treatment or public health control.

These statistics correspond partially with those in the sixth annual report, 1920, of the National Committee for the Prevention of Blindness, as follows:

PROPORTION OF PUPILS NEWLY ADMITTED TO SCHOOLS FOR THE BLIND DURING THE PAST ELEVEN YEARS WHO ARE BLIND FROM OPHTHALMIA NEONATORUM:

School year	Number of schools and day classes	Total new admissions	Pupils blind from O. N.	Per cent.
1907-8	10	290	77	26.6
1908-9	14	300	68	22.7
1909-10	13	325	67	20.6
1910-11	15	351	84	23.9
1911-12	24	415	88	21.2
1912-13	21	386	88	22.8
1913-14	19	428	84	19.6
1914-15	28	602	91	15.1
1915-16	35	666	127	19.1
1916-17	34	647	119	18.4
1917-18	40	614	90	14.7
1918-19	44	621	105	16.9
1919-20	47	749	174	23.2

Altho there has been a steady decline in the proportion of pupils admitted from 1907 to 1918, the increase in the last two years has offset the actual truth of this apparent decrease. During the school term, 1919-20, there were in 47 schools for the blind in this country 4,144 pupils, of whom 997 or 24.1 per cent. were blind from ophthalmia neonatorum. These figures compare closely with those from the Pennsylvania Institution and indicate that the end results of ophthalmia neonatorum have not been greatly affected by the prevailing measures of control.

NEW MEASURES ADVOCATED.

I personally believe that more rational measures must be adopted for the prevention and treatment, in order to reduce the evidence of blindness caused by it.

(1) All expectant mothers should be under the care of a physician, a nurse or a health organization doing prenatal work. In the experience of the Division of Child Hygiene of the Bureau of Health of Philadelphia, not one case of ophthalmia neonatorum developed in 18,000 births during the last five years.

(2) The prophylactic toilet of the eye should be changed from one instillation and one drop of a strong silver nitrat solution, to several drops of a bland but effectual antiseptic, such as fresh solution of argyrol (25%), and repeated on three successive days after birth, followed in each instance by thoro flushing of the eyes.

(3) Every physician and midwife should be held to account for failure to use a prophylactic within 24 hours after birth, should the case result in blindness. The number of cases of gonorrheal eye infections in the new born which do not receive a prophylactic at the birth, is much greater than generally supposed; and these are cases in infants delivered by physicians.

(4) Cases of sore eyes should be be made reportable by midwives, nurses and attendants, during the first four weeks instead of the first two weeks, as required by law, because records distinctly show that ophthalmia neonatorum may occur as a primary infection during that time.

(5) To the birth certificate may be conveniently added a supplementary report as to the presence of sore eyes. This would give the health official immediate and more accurate information as to the prevalence of this disease.

(6) Health officials should follow up every reportable case with the view of ascertaining if proper treatment is being given, and until the disease has terminated. This should be especially stringent among the colored race, which according to the last two reports of the Bureau of Health contribute proportionately one-third of the true gonorrheal cases.

A summary of the statistical information collected is as follows:

(1) The average incubation period of ophthalmia neonatorum is three to seven days, but may be in exceptional cases as long as two weeks.

(2) One instillation of any prophylactic is not a positive protection against the disease.

(3) A large proportion of the new born do not receive any prophylactic instillations.

(4) Secondary infections of the gonorrheal type are not common. A large number of the nongonorrheal type are due to chemical irritants used in the eyes.

(5) Blindness from ophthalmia neonatorum has not been reduced in appreciable proportions by the present methods of prevention, treatment and control.

It behooves the medical profession and the health officials to adopt more effective measures of control and prevention of ophthalmia neonatorum, since the children in schools for the blind who are sightless as the result of this disease, are living monuments of ignorance and neglect, and are proof of the failure on the part of the profession to curb and control this preventable disease.

THE EYE IN BERI-BERI.

ANTONIO S. FERNANDO, M.D.

MANILA, P. I.

This paper from the Philippine General Hospital, Manila, reviews the scanty literature of the subject and reports in detail three cases. It then discusses the connection of the sypmtoms with beri-beri. These include dimness of vision, disturbance of color sense and inconstant hyperemia, blurring of the optic disc, and a slight neuroretinitis.

Since the early part of 1921, there came under my observation in the Free Dispensary of this hospital a number of cases of dimness of vision, which could not be corrected by glasses and with more or less negative ophthalmoscopic findings. In the endeavor to find the possible cause of this complaint, a careful inquiry into the history of each of these patients was made. In my investigations I found that these patients either have had beriberi previous to the onset of the visual disturbance, or were still suffering from the symptoms of the disease at the time they came to the eye clinic.

In my paper entitled "A Brief Clinical Survey of Eye, Ear, Nose, and Throat Cases in the Philippine General Hospital Dispensary," read before the Manila Medical Society at its meeting of December, 1921, I have already mentioned the association of this eye complaint with this deficiency disease in the statement which follows: "Some cases of moderate impairment of vision among parturient women, which cannot be improved with glasses, are found to be due to gravidic nephritis or to beri-beri amblyopia." At first it was thought that these cases occurred only among beri-beri parturient women, but I have had several cases lately of the same eye complaint with definite history and positive physical findings of beri-beri in young male adults.

This lent more interest to the subject and led me to undertake a more careful and detailed study of these cases, with a view of establishing the relation of this eye symptom to this nutritional deficiency disease. These cases, with a view of establishing the clinic with the above eye complaint and history of beri-beri, were referred to either Dr. A. B. M. Sison or Dr. W. Vitug of the Medical Department, who in all cases confirmed the diagnosis of beri-beri. In those cases where the heart could not be well outlined by percussion and auscultation, an X-ray of this organ was requested. In order to carry out this work more extensively, I have secured the cooperation of the above named doctors, and the privilege of examining the eyes of all beri-beri patients in the medical wards with or without eye complaints.

As far as I am aware, nothing is mentioned about this eye symptom in the literature on beri-beri published in these Islands. After much effort in looking up references on this subject, I have found an article by a Japanese by the name of Y. Itoh, published in the Jubilee Volume of Professor Komoto, entitled "Disturbance of Color Sense in Beri-beri, Amblyopia and Retinitis Centralis." Acording to this author, both of these affections are common in Japan, and in beri-beri amblyopia the green is first rendered invisible, while in central retinitis the yellow is mostly destroyed. Again, Ishida, according to his article in the Nippon Gank. Zasshi of April, 1918, found that out of 217 cases of retrobulbar neuritis he collected from the records of the University Eye Clinic at Kyoto, 6.4% were due to beri-beri.

T. H. Weisenburg, in the chapter on "Diseases of the Spinal Cord and Spinal Nerves" of the text book "The Eye and the Nervous System," by Posey and Spiller, mentions the occurrence of eye symptoms in beri-beri or Kakke neuritis, but that "they have been insufficiently studied." He further says that he observed a number of cases of disturbance of vision, "even complete blindness" among Filipinos, but that the eye complaint disappears if the patient improves. He mentions also that Kessler, who has examined the eyegrounds in 60 such cases, found narrowing of the retinal arteries, whitish paling of the papilla, and in a large number of cases, the edges of the disc were blurred. It is thought that these changes in the disc are due to the general nutritional disturbances, which is extreme, and not to the multiple neuritis.

In my collection of about 20 cases of this beri-beri amblyopia, so far studied, the great majority had as chief complaint foggy vision. This was especially common among parturient women, and sometimes also observed in young adults, commonly students. As a type of these cases I will present the following case history:

Case 1. D. V., of Sta., Mesa, Manila, female, 26 years old, married, came to the clinic with the chief complaint of foggy vision. It was also noticed that this patient had a tendency to narrow the palpebral fissure in the presence of bright light. When questioned as to why she looked in this way, she explained that her eyes dazzled and got easily tired. Her history is that since her third para (i.e. four years ago), she had numbness of the extremities and around the lips. These symptoms were more marked after the delivery. At the time she came to the clinic, she said that she was also suffering from dizziness, and dyspnea on slight exertion. Eye findings were as follows: Cornea clear, conjunctiva normal, pupils slightly contracted, but round and symmetric. Eye was very sensitive to bright light. Vision O. D. 20/20-4; V. O. S. 20/30, but with much difficulty. The eyes got easily tired. Vision could not be improved with glasses. Ophthalmoscopic findings: disc margin hazy, mild retinitis present. This case was referred to the Medical Department, and Dr. Sison confirmed the diagnosis of beri-beri Heart was found enlarged to the right. The treatment instituted was aimed at the correction of the diet and administration of strychnin and other nerve tonics. One month later the condition of the patient improved, and with it there was also improvement of the vision. V. O. D. 20/20; O. S. 20/20-4.

Case 2. Another case among those collected had a different visual disturbance. The patient, A. U., a boy, 16 years old, student, residing in Manila, came to the clinic complaining of inability to see well at night. He was taken to a feebly illuminated room, and this complaint was confirmed. This patient gave the following history: In Aug., 1921, he had fever for three days, then numbness and weakness of the extremities (so much so that he could hardly walk), and chest oppression. He consulted in the Medical Clinic, where the diagnosis of peripheral neuritis was given. He improved with chloroform liniment and elixir I. Q. S. prescribed there. Then three weeks before he came to the eye clinic, he again had fever for two days, and when he recovered he complained of hoarseness of the voice, numbness of

the extremities, dyspnea on slight exertion, and poor vision at night.

When he was first seen, it was noticed that he tried to avoid bright light. Eye easily tired. Further inquiry into the history revealed the fact that two brothers and one sister died in early infancy, of a disease strongly suggestive of infantile beri-beri. Examination of the eyes showed nothing abnormal externally. V. O. D. 20/20; O. S. 20/20, but with much difficulty. Fundus showed clear retina and normal disc. Visual field for green markedly contracted in both eyes. The patient was again referred to the Medical Department. X-ray of the heart showed it to be enlarged, especially to the right. Knee jerk absent. Urine examination negative. Red and white cell counts normal. The treatment consisted in correction of the diet and administration of nerve tonics. The patient apparently improved, as there is no more dyspnea now, and the vision at night has almost returned to normal.

CASE 3. In a patient from the medical ward who was actually suffering from marked symptoms of the atrophic form of the disease, I found a low grade of neuroretinitis. This patient was admitted to the hospital on Aug. 10th, this year, with diagnosis of beri-beri and abnormal puerperium. On admission she had slight rise of temperature and was unable to walk. There were paralysis of the right leg and marked weakness of the left. Calf muscles are flabby and atrophied. Hyperesthesia of the lower extremities was also present. Knee jerk absent. There was general enlargement of the heart. Urine negative. White cell count 13,000. V = 20/20 in either eye, and the fundus, as I have said before, showed changes of neuroretinitis.

COMMENT.

It has been observed that those patients in this series who have had visual disturbances had the disease sometime previously (from a few months to about 3 or 4 years); or, if they at all showed any beri-beri symptoms at the time they came to the clinic, these were only very slight. The form of the disease observed in almost all these cases was of the rudimentary type. Judging from the above observation, may we not expect some visual disturbance some time later in the patient last cited?

Taking up in general these cases of beri-beri amblyopia observed here, certain important facts can be established:

1. In all these cases there was found a definite history of beri-beri, mostly of the rudimentary form, i.e., the patients are walking patients with complaints of numbness of the legs, sometimes weakness, and in some also dyspnea on slight exertion. Urine was negative in all these cases. The diagnosis of beri-beri in all of them has been confirmed in the Medical Department.

2. The chief complaints have been foggy vision, eye being easily tired, especially at night, and easily dazzled with bright light.

3. Externally, the eye does not present any abnormality except that in some cases there is the tendency to narrow the palpebral fissure to avoid dazzling. The cornea is clear, the pupil, in some cases, may be slightly contracted.

4. Vision not much impaired, in many 20/30, and in some 20/20, but with much difficulty and missing several of the letters. No improvement could be obtained with glasses.

5. In those cases where the field of vision has been taken, a marked contraction for green has been found.

6. Findings in the fundus not constant. In many cases there was slight hyperemia of the disc and blurring of the edges. In others no distinct lesion was found. One case showed low grade of neuroretinitis.

7. The recovery in these cases has been slow, and in some the improvement in the general condition by a change in diet and administration of nerve tonics and of extract of tikitiki was followed by improvement also in vision.

Since a few years ago, there has been drawn a considerable amount of attention to deficiency diseases. Experimental deprivation of some food factors has given rise to a recognizable

pathogenic state. McCollum found that the lack of substances containing fat soluble A in the diet gave rise to xerophthalmia, while if the water soluble B constituent be lacking beriberi results. According to Vedder, "beri-beri is a disease resulting from faulty metabolism, and is directly caused by deficiency of a certain vitamine or possibly of several vitamines in the diet." He further states, that among women beri-beri is more frequent during the child bearing period, often developing during pregnancy or the subsequent lactation. These people, because of the added stress on their systems, may be said to be in the "twilight zone" where small shifts in the quality of the diet may determine the pathogenic state.

Night blindness, as observed in one of my cases, may be explained by the deficient nutrition of the structures of the eye, secondary to the deficient nutrition of the whole body. Among the laity here the term "matang-manok" is given to a rather common condition observed among older children, or loss frequently in adults, of poor vision at night. These people are otherwise apparently healthy and with no lesion in the eyes. ("Matang-manok" means eye of chicken.) Now since beri-beri has been common and is endemic here in the Philippines, is it not possible that many of these cases of "matang-manok" may be no other than beriberi amblyopia? Retinitis pigmentosa and retinitis punctata albescens also give rise to night blindness, but these conditions are very rare. Only one of the former and none of the latter has been recorded in this hospital, so far as I am aware. Xerosis of the conjunctiva and keratomalacia may give rise to the same condition, but the general condition of these patients and their eye lesions are not seen in those to whom the term "matang-manok" is generally given. These cases of "matang-manok" are not now so common as before. Is it not because there are fewer cases now of beri-beri as a result of the effective campaign instituted here?

This form of amblyopia observed in these cases affects both eyes, and this is in favor of its being secondary to a general or constitutional disorder.

According to Vedder, beri-beri produces degenerative changes in all the peripheral nerves, but the condition is not a simple neuritis, but a degeneration of the entire nervous system as well as of other organs. It is therefore not surprising to find, as I have found in one case, changes in the optic nerve—neuroretinitis, and this was in a patient with marked paralysis and suffering from the atrophic form of the disease. In Japan, Ishida observed retrobulbar neuritis in some of his cases of beri-beri, and it might be that those cases were of the severe form of the disease. Our cases here where amblyopia has been observed are of the rudimentary form only.

Conclusion. My aim in presenting this paper has been to call the attention of those here in the Philippines to this seemingly unimportant eye symptom in a common disease here as beriberi, and to invite others, specially those of us who practice ophthalmology in the tropics, to carry out exhaustive investigations in this relation of the eye to this important deficiency disease. Due credit should be given to the Japanese ophthalmologists, who are responsible for much of the literature on this subject.

Before closing, acknowledgment is hereby made of the valuable cooperation Dr. A. B. M. Sison of the Medical Department has given me.

CLINICAL ASPECTS OF EYE SYMPTOMS IN ENCEPHALITIS LETHARGICA.

By WILLIAM G. CAMERON, M.D., F.A.C.S.

TACOMA, WASHINGTON.

An epidemic of Encephalitis Lethargica in 1919 and 1920 passed thru America, and a few cases developed on the Pacific Coast. The clinical histories of ten cases with comments, are herewith given. In all cases, other special and general consultants were seen, and both the general and ocular diagnosis confirmed.

CASE 1. Mr. F., Engineer, age 52.

Aug., 1919. For the past 3 or 4 days near vision has blurred, so that he could barely see to read a newspaper. Came for a change of glasses. I had refracted him numerous times and had his ocular record for the past ten years. I found no change in his distant vision, which was 20/20 in each eye, but with his presbyopic correction he said the print looked misty. Pupils were equal and reacted to light and distance. Fundus showed no change.

He was sent to the hospital for examination. Four days later he became somewhat delirious and semiconscious. The left pupil became dilated, the eye diverged and he had ptosis of left upper lid. Fundus remained normal. He died ten days after onset.

There was progressive paralysis of 3rd nerve. Accommodation first affected, then the pupil and last complete paralysis with ptosis.

CASE 2. Dr. W. B., age 60.

Oct. 27, 1919. Two nights ago he attended the movies. The next morning he had double vision, which lasted that day. He has no more diplopia, but eyes feel strained and he is physically tired. Vision R. 6/20; with 1.50 S. ⌒ .50 C. Ax. 180° =6/7.5 L. 6/20; with 1.50 S. ⌒ .50 C. Ax. 180° = 6/6. Right pupil is larger than left. Both sluggish to light. Media clear. Fundus congested. Disc normal. Esophoria 8°.

He was sent to the hospital with a tentative diagnosis of encephalitis, which was confirmed by his attending physician. His throat was sore with the onset of his disease, and temperature had risen to about 102° each evening.

Six days after the onset I did a tonsillectomy, and after that his temperature was but slightly above normal. He was in bed for ten weeks, during which time he suffered most from neuritis in arms and legs.

Jan. 10, 1920. Right pupil still dilated. Can read with difficulty with glasses. Both discs pale.

There is a marked difference in the optic nerve from when I first saw him, and I believe I missed seeing an optic neuritis from not examining his fundus during the height of his attack. No muscular imbalance present.

April 21, 1921. Dr. B. was unable to return to his office for eight months, and even today, one and one half years since his sickness, he has not regained his usual health. The pale optic nerves have gradually recovered, but his right pupil is still slightly dilated and the right eye tires easily upon use.

Note 1. Slight impairment of function of external rectus lasting but one day. 2. Oculomotor paresis affecting only pupil and accommodation.

CASE 3. A. W. C., policeman, age 35.

Nov. 9, 1919. Seen in hospital in consultation. He has had fever, with intense pain in right ear, side of face and headache for past seven days. No diplopia. Examination of ears, nose and sinuses negative. Ophthalmoscopic examination negative. About a week later, he began to complain of photophobia, which increased. At this time fundus examination showed beginning neuroretinitis. In a few days more, pupils became dilated and there was some ptosis of each upper lid. Had marked loss of accommodation.

Jan. 29, 1920. Eleven weeks after onset, up and about, still very weak, nervous and irritable. Cannot see to read.

R.V. 6/7.5. L. V. 6/6 not improved with glasses. Near point 29 cm. type 0.50. Give +1.0 S. for near. Pupils still dilated. Optic nerve somewhat pale. Fundus normal.

This patient never recovered but was committed to the hospital for the insane, about 8 months after his illness, and died a month ago.

Note 1. 3rd nerve paralysis affecting the entire nerve; accommodation, ciliary body, external eye muscles, and upper eyelid. 2. Neuroretinitis. 3. Neuritis of 5 nerves.

CASE 4. Miss A., age 23.

Comes for examination of eyes. For 2 or 3 days past has double vision and cannot see to read. Is drowsy and feels tired. Has external deviation of eyes, loss of accommodation. Fundi normal.

She was given a letter to her home physician, who later reported she had an attack of encephalitis lasting about one month.

Note. 1. 3rd nerve paralysis muscles and accommodation. 2. Fundi normal.

CASE 5. Mr. L. F. B., age 24, lumberman.

Dec. 9, 1919. For past three days had diplopia. Lassitude, loss of appetite, soreness in muscles of neck. Vision, R. 6/10, L. 6/10, not improved with glasses. Pupils equal. Both eyes, edges of optic nerve obscured, retina cloudy. Exotropia 8°.

Diagnosis of encephalitis, and sent to hospital under care of his physician.

Jan. 26, 1920. Feels entirely recovered but unable to read. Vision same as before. Pupils equal, but sluggish reaction to light. Optic nerve normal. Retina slightly cloudy. Near point 42 cm. type 0.62. Requires +2.50 S. for reading.

Note 1. Third nerve paralysis affecting external eye muscles, and accommodation, pupil but slightly. 2. Neuroretinitis.

CASE 6. Mr. J. L. H., age 63, mill worker.

Dec. 26, 1919. Forty-three days ago noticed he saw double. A few days later he began to feel tired and drowsy and had some fever. Temperature lasted for thirty days. He still feels tired and sleepy, but has had no diplopia for a week past.

Vision R. 6/30; + 1.75 ⊃ +.50 C. Ax. 180° = 6/7.5. L. 6/60; + 2.00 = 6/12.

Vision for reading blurred with addition for presbyopia. Examination shows pupils equal. React to light sluggishly. O. D. Disc faintly pale. Arteries small. O. S. Disc pale. Arteries small. This man was refracted by me two years ago. His vision at that time was: R. 6/15, with correction 6/6; L. 6/15, with correction 6/6. He could read readily with proper correction. Reduction of vision from 6/15 to 6/30 in right eye and 6/15 to 6/60 in left eye.

Note. 1. Lateral diplopia from 3rd nerve paralysis. 2. Pale nerve resulting from optic neuritis.

CASE 7. C. H., age 42, owner of garage.

Dec. 15. Yesterday pain in right ear which has become intense, accompanied by severe pain of right side of head. Was called in consultation for a probable otitis media. Tympanic membranes pearly white with good light reflex. Gave opinion that ear was not affected.

Dec. 16. Pain in ear has become excruciating. Paracentesis of tympanic membrane reveals no serum or pus. Was sent to hospital.

Dec. 20. Pain continues, and patient has become delirious and is now semiconscious. Today he has double vision. Right pupil dilated. Right eye turns slightly out.

Dec. 30. Pain entirely gone. Has been rational for past two days. No more double vision. Right pupil still dilated. Cannot see to read.

About two months later I talked with him on the street, and he said his distant vision was good, but he had difficulty in reading, and would come to see me to get reading glasses.

This was the last time I saw him. He returned to his home in a nearby town, and from reports from mutual friends I learned he was very nervous and melancholy. In Oct. 1920, he shot himself thru the head with a revolver.

Note. 1. Oculomotor paralysis. Muscles, pupil and accommodation. 2. Fundus normal. 3. Neuritis 5th and 7th nerves.

CASE 8. Mrs. D. G. Y., age 42.

Jan. 2, 1919. Seven weeks ago she began to feel tired and dizzy. Was nauseated and had a slight fever. At the end of a week she had double vision horizontally, which persisted for five or six days. She has been under treatment for encephalitis, and feels well except that left side of the face is numb; has neuritis in left arm and vision in left eye is hazy.

Vision R. 6/10, L. 6/15.

The lids of left eye are more widely separated than right, and the face is more smooth, showing but few wrinkles. Left pupil is somewhat dilated. Reacts sluggishly to light. Media clear. Disc pale. Fundus congested. Right eye normal in appearance. At 35 cm., left eye requires + 2.00 S. to equal right.

I had examined this patient six months previously, at which time her vision was R. 6/10 with +0.50 =6/6. L. 6/12, with +1.00 ⊃ +.50 C. × 180° = 6/6 — 4. Fundus in each eye was normal.

In this case we note: 1. Partial paralysis of 7th cranial nerve. 2. Palsy of motor oculi, the fibers supplying the external muscles first recovering their tone. The contractor fibers of the iris still slightly affected, and the accommodative nerve of the lens still markedly paralyzed. 3. Fundus congested with a pale nerve; is probably the result of a neuroretinitis.

CASE 9. J. A. H., age 35, laborer.

Jan. 30, 1920. Consultation in hospital. Has been sick a week with dizziness, and headache with diplopia. Now has moderate fever with talkative delirium. Pupils equal. Fundi normal. Right eye turns up and out. Delirium and fever continued for ten days, about which time he had partial right facial paralysis. Was in hospital one month.

March 5. Able to be about, but not strong enough to work. Facial paralysis cleared up. Does not have diplopia unless he looks to the right. He says his distant vision is the same as before sickness, but now he is unable to read.

Vision both eyes 6/7.5; + 0.50 S. ⊃+.25 C. Ax. 180° = 6/6. Requires addition of +1 S. to this correction, to be able to read.

May 10, 1920. Condition unchanged.

Note. 1. Pupils equal. 2. Paralysis oculomotor nerve fibers affecting lateral eye muscles and accommodation, but not pupil sphincter. 3. Fundi normal. 4. Facial paralysis.

CASE 10. Mrs. J. R., age 50, housewife.

Feb. 4, 1920. Eleven days ago had teeth in right upper jaw extracted. Past four days has blurred vision and diplopia. Feels tired and has headache. Examination; sinuses, nose and throat, negative.

Vision each eye 6/15, with correction 6/7.5. Pupils equal. React to light and distance. Media clear. Disc round, good color. Fundus apparently normal. Right eye turns in 5 degrees and up 2 degrees.

Referred to her physician, who in a few days confirmed provisional diagnosis of encephalitis. Diplopia lasted two weeks.

Note. Paralysis of right external rectus. No other nerves affected. Complete recovery from eye symptoms.

In these 10 cases we find that diplopia was caused 8 times by paralysis of the oculomotor nerve, and twice by that of the 6th. In one of these latter (Dr. W. B.), the affection was slight, lasting but one day, amounting to 8°; and was accompanied by paresis of the nerve fibers of the 3rd nerve supplying the contractor muscle of the iris and the ciliary body.

There were 2 cases of paralysis of the 7th nerve, evidenced by facial paralysis. There were 2 cases of neuritis of the 7th and 5th nerves, shown by the intense pain in the ear and side of face. In five cases the fundi were normal. Two showed decided neuroretinitis, with obscuration of the disc edges and swelling and clouding of the retina.

Three showed an optic nerve which was pale with a congested fundus, suggestive of a recent neuroretinitis; all three of these I had previously examined, so that I knew the appearance of the fundus was normal.

It is interesting to study the effect upon the oculomotor nerve, occurring in 9 out of the 10 cases. In two cases there was a complete paralysis, starting with loss of accommodation and dilatation of the pupil, followed by diplopia and ptosis.

In the seven other cases there was no ptosis, but all had loss of accommodation with dilatation of pupil and diplopia in varying degree.

The paralysis of the lateral muscles cleared up in from 1 to 10 days in all cases except one, in which it lasted for three months.

There has been a persistent loss of accommodation lasting for two months, two to three months, two to six months, and one to one and one half years. This does not mean that they had recovered in the time given, but is the space elapsing after their sickness, when I last saw them and they still had loss of accommodation.

CONCLUSIONS.

1. In encephalitis any of the cranial nerves may be involved.
2. The lesion may be a neuritis or paralysis.
3. The 3rd nerve is most often affected.
4. Loss of accommodation is one of the earliest eye symptoms to appear as well as the last to recover.
5. Neuroretinitis occurs in about one-half the cases.

FUNCTIONAL CHROMO PERIODIC HEMIANOPSIA.

J. N. RHOADS, M.D.

PHILADELPHIA.

This paper reports the personal experience of the writer with attacks of this nature, with his medical history in so far as it might throw light upon the etiology of such attacks. The subjective appearances described have varied rather widely at different times and the hemianopsia has been altitudinal rather than lateral. They have never been preceded nor followed by headache.

J. N. R., tall, dark, aet. 63 years, weight 145 lbs. Wassermann negative; never had any specific disease. Mother died of epithelial carcinoma of the breast, at 33, when I was 18 months of age. Father, a carpenter, a thin man six feet two, died at 72.

At twenty I had typical southern malaria. Had chills every day; alternate days; seven days; fourteen days, and the dumb ague interspersed between. Quinin and arsenic promptly cured the disease, and there never has been any return. However, for some years after there was an intermittent heart. Blood pressure is 140, arteries normal.

On July 13, 1900, I was thrown out of my carriage on my head and was unconscious for five hours. I was only two days laid up. Prior to kidney trouble had right testicle crushed by the collapse of a surgical chair, which was followed by hematocele, and removed by an operation under ether. There were no eye symptoms during or closely following the operation. Fifteen years ago had hematuria, passing nearly a pint of pure blood at once; caused by gasolene toxemia. This was followed by cystitis and a chain of bladder symptoms.

Five years ago my right kidney and two ribs were removed. I lay in the hospital three months after the operation. There was perfect recovery, and I have had no nephritic troubles since.

When forty had my first eye break down. I do not know that it had any bearing on the chromatic phenomena. My first attack was not chromatic, it was black, and occurred after prolonged physical and mental exertion. I had been put on an anniversary program to make an address at four o'clock on the following Sunday afternoon. I sat up thru the night till four o'clock in the morning working on my speech. At eight in the morning I was out in my carriage, rushing in and out of the houses, seeing patients till twelve. I then went to a hospital and stood by and assisted for a couple of hours in a plastic operation. At two

o'clock I entered my carriage again, and continued to make calls till 4 P. M., and dismissed my coachman. I was the last speaker on a list of six. My efforts were received with applause, and I went away happy. I had one visit yet to make. After making the call I took a street car for home feeling wonderfully fine and contented. As I entered the car, the upper half of my field of vision suddenly failed me. I looked at the conductor twenty feet away, and I could see only half of his head; the other half was a dirty black hole.

It did not take me long to get home. I was profoundly frightened. I could not see at all on the upper half of the field of the vision; no streamers of light, not even flashings. The demarcations in the vision were sharp. The conductor was headless at the first glance, as tho his head had been cut off with a sword. Afterwards, the line of demarcation followed the movements of my eyes. After I got off of the car a large black hole, with a straight edge next to me, moved ahead of me, in the pavement. There was no pain, no unsteadiness in locomotion. Arriving at home, I went to bed and sent for a surgeon, who came within half an hour, but by that time the condition had vanished and my sight was again normal. I can not be definite as to the length of time between the first, (and only black attack), and the first chromo attack; but I think it was about two years.

The color of the first chromo attack was brassy yellow and it lasted about fifteen minutes. This first yellow floating scotoma was perfectly round. It seemed to appear full size at once. It was about an inch and a half in diameter, 2 ft. away, and kept moving toward the ceiling. I was at the bedside of a patient. I was much scared. I did not notice whether it came on the field from the top or the bottom. It was too new to me, and I was too much alarmed to take notes. I made tracks for home a half mile away, but before I reached there the phenomenon had disappeared.

My attacks while lying in the hospital after the nephrectomy were more severe, especially those closely following the operation. I had over twenty conjestive chills during the first month after the operation, which kept me exceedingly weak. I remember one gross attack which practically covered the entire field, so that I was unable to see my attendants, who stood by my bed, for fully five minutes. This was my first attack in silver and black. I had many attacks while in the hospital which were silver and gold, black and gold, and blue and gold.

I got back to my office three months after the operation, and did not have a single attack for four months from that date, nothwithstanding the fact that I was reading, at least, three newspapers each day. After the four months freedom from the attacks they came on again, and the first day I had them five times in one afternoon. I now have the attacks on an average once a week. I have never been more than a month free from them in the last three years.

Two or three times during the last twenty years I have had the *attacks at night*. Except that night attacks were half over before I awoke, they in no wise differed from those which came on in the day. To be sure, the first one frightened me and worried me for a day or two.

There seems little change in the regular attacks in any way. When I do not see them for three or four weeks, I begin to entertain a hope that I will see no more of them, only to be disappointed in a day or so.

A Typical Attack. I estimate that I have had more than five hundred attacks during the last twenty years. Nine times out of ten they come on in the forenoon. The first thing that I notice is a blurring in the extreme edges of the visual field. I may then pick up a paper to see if an attack is coming on; which I can tell by finding a twirling later somewhere in the field; or by looking at some member of my family and seeing his features slightly obscured, especially with an indirect look. Then in about five minutes comes one or two black or gold strips always standing at the same angle, about 65 degrees. These

strips then accumulate from both sides making up like lattice fence, having a rough checker-board effect, about as seen in Fig. 1. There is always a blending of the shades and color, changing every fraction of a second, which makes it too elusive for the lithographer and me to define. There is never distinctively half of the field involved. If, for instance, the attack should begin at the right, say at 180 degrees and go off at the left, there will be no time, but that I can see normal somewhere in the field; the normal zones preceding and following the lattice work are never stationary, never the same size, never the same outline. Once, only, did the whole field seem to be involved, after my operation in the hospital, but it was not dark,—far from it,—too much light,— myriads of kaleidoscopic light, thru or around which I could not penetrate, but I have no doubt if I could have pushed the field further away the periphery was good.

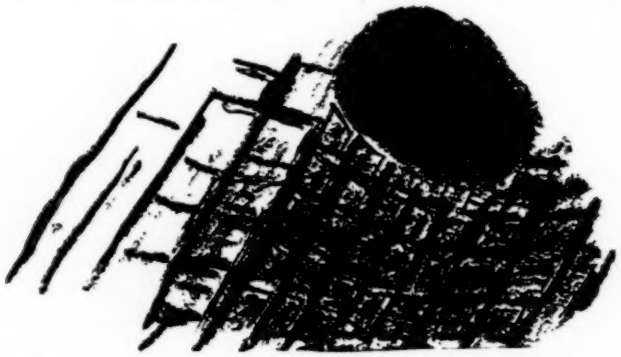

Fig. 1. Diagram of appearances during typical attack of scintillating scotoma. The oval area above and to the right would be green; the diagonal lines below, the black and gold stripes; the lighter area to the left blue.

I never have any warning. There is no aphasia, no aprosexia, no vomiting, no headache, no vertigo. From the start the lights get brighter momentarily, and the lattice squares increase in number, but the angle does not materially alter nor do the vibrations or rotations change their speed. If an attack begins as a vibratory attack it continues as such, and, likewise, if an attack begins as a rotary it does not become vibratory. It is never mixed. The speed of the movements are as near as I can count them 130 per minute, always the same.

When the maximum has been reached, generally in about fifteen minutes, the colors begin to fade, and finally the edges of the field cease to vibrate, or revolve. While there are many tints of yellow, varying all the time, I do not often see other colors. I do, however, sometimes see blue and always see it on the left side of the scotoma, beautifully blended in.

By facing a window and closing my eyes tightly, I can see a faint rose tint to the right of the scotoma, and strenuously attempting to dilate my irides under my closed lids, the rose instantly becomes grass green. Of course, it is understood that whether I close my eyes or keep them open the obscuration proceeds to run its course. The darker the outside surroundings, the brighter the colors. The attacks are never homonymous, nor has the fixation point anything whatever to do with them. My sight is somewhat dimmed just before the movement begins at the periphery, but it is always exceptionally clear after the attack has passed.

These attacks never come on the field and go off at right angles. Sometimes they begin at the right and pass clear across the field; sometimes they begin at the right and come about to the middle of the field and go back; sometimes they approach from the left and go back; sometimes the scotoma crosses the bottom edge of the field, and of course such attacks interfere very little with my refraction work. I think that an attack passes off quicker if I close my eyes. I can not do retin-

oscopy in the midst of an attack, but if I am at the case I usually go right on with my work. I wish to impress the fact that it has only been of late years that I have been able to work thru an attack. I used to become so frightened, that I would go and lie down, and even my servants could tell by the look on my face that I was having a "spell". I have no history of anything like it having preceded me, and my children have not reached the age at which I was first attacked.

TRANSIENT CHROMATIC SCOTOMA.

While there has been no change in the original attacks, there has come a new and marked variation in them as will be seen in Fig. 2. This is a very transient central scotoma, appearing,

Fig. 2. Diagram of small illusive central scotoma, the lines of which appear in black and gold.

as it were, only fourteen inches away. I see it only for a half a minute. Winking or closing my eyes, it vanishes not to reappear. If I attempt to move it to the ceiling, or out of the window, or, to any part of the periphery it instantly vanishes. This tiny elusive scotoma appears in black and gold. It is nearly round, and about one-half an inch in diameter. *It does not vibrate, spin or flicker.*

It has appeared only when I have been intensely watching the point of the index on trial frame, as it was being swung for astigmatism axes. It would go wherever I would direct my near vision. It so happens that it generally comes to the left, because I refract that way, and it is when I am focusing on the index on my frame. I have very rarely seen it on other occasions, but I have not seen it for more than a month, notwithstanding I had an attack yesterday and day before, both of them small in size, occupying one-tenth of the field at the middle of the attack. The first time I saw it I thought it was the beginning of a regular attack, but it was not. Lately, I have come to the conclusion that except from its probable connection with the tension of chiasm, it has little to do with the regular attacks. I can not produce it at will by watching the index, but it comes on once in a hundred times or so, while I am watching it. It is visible only during accommodation, and only at the near point. It is to be noted that during its brief existence there is a difference in the tension of the globe caused by the forcible focusing. *Whether the infinitesimal altering of the tension in the eye would have anything in the chiasm I know not, but I believe that either or both of these tensions start the chromatic manifestations which burden me.*

I have gone to a lot of pains to try to ferret out the etiology of my attacks, but I still do not believe that the disease is as rare as the dearth of the literature on the subject would indicate. Cases without color, (painless), I believe often occur, but owing to the short duration of the attacks are not reported to the oculist. School teachers tell us of sending frightened children home, because they complained of seeing "lights" in their eyes.

I was told that my trouble was *migrain*, and yet I never had a headache in all my life, and during these attacks I never had a single symptom of migrain, but the transient impaired vision. I feel that we owe it to the victims of functional chromo periodic hemianopsia to tell them that they have nothing to fear from their trouble, which can not be said of migrain. Of course, it must be understood that the surgeon will have to differentiate between migrain, with all its train of prodromes, and concurring suffering, and functional color scotoma, which has neither prodromes nor pain.

I would like to call attention to the difference between my attacks and Föster's. "His attacks began with a dimness of vision in both eyes, which gradually increased until a complete defect embraced everything lying within the field of vision to one side of the fixation point. These symptoms are followed by flickering, etc." In my

case the fixation point has nothing to do whatever with it, and the rotations and vibrations begin first; and the scotomata are always silver and black, yellow and black, blue and green, or rose, and I nearly always have good vision somewhere in the field.

As to treatment for my transient scotoma trouble, except general tonics, I never went under any treatment. I now believe it possible to alter the chiasm tension by the proper administration of organotherapy, and, consequently, in cases of recent origin I would suggest its use. I never took iodin, or mercury. Beside negative Wassermanns I have ten living healthy children, and 13 living healthy grandchildren.

In conclusion, if I have succeeded in modifying the thought that "flashes of light" in the eyes mean biliousness, or in lessening the suffering of those who die a "hundred deaths," or separating *migrain* from *functional chromo periodic hemianopsia*, I shall feel repaid for taking notes and experimenting on my eyes for twenty years and more.

FUGACIOUS HOMONYMOUS HEMIANOPSIA; A CLINICAL STUDY.

JOHN M. BANISTER, M.D., F.A.C.S.

OMAHA, NEB.

This is a general sketch of the clinical condition in which details and emphasis are supplied by its author's personal experience. The usual explanation of vasomotor disturbance of toxic origin is accepted and illustrated. Read before the Medical Association of the South West, Hot Springs, Arkansas, October 16, 1922.

The sudden occurrence of a marked hemianopsia, even of the temporary type, is frequently so alarming to the patient and his family, and, in many instances, so disconcerting to the physician, that this affection would seem to deserve more than the scant attention accorded it in medical literature, especially in its toxemic relations. The type of temporary hemianopsia to be discussed in the present paper is the homonymous lateral variety, termed *partial fugacious amaurosis*, or *scotoma scintillans*.

The suddenness of onset of the attack; the intense alarm on the part of the patient; the feeling of extreme illness induced; the marked involvement of vision; the inability to think connectedly; the possibly simultaneous occurrence of numbness and tingling in the arm, forearm, thigh, or leg, of one side; the frequent presence of a partial aphasia of the amnesic type, which may exist to such a degree as to render the victim unable to speak intelligibly, or even to call the names of members of his own family, are symptoms well calculated to brand this affection as one of importance—one, too, in which the medical attendant is brought face to face with an insistent demand for immediate diagnosis and speedy prognosis.

"Is this a serious brain affection?" "Is an attack of apoplexy imminent?" "Will this loss of vision be permanent?" "What is indicated by the failure of power of speech?" "Is there danger of a fatal result?" All of these questions, and more, will be propounded to the hurriedly summoned medical attendant immediately upon his arrival at the bedside. Fortunate will it be for him if he is able to elicit a pathognomonic symptom, which will be a harbinger of a safe and speedy recovery.

Is there such a symptom, which, while absent in the permanent type of hemianopsia, is so frequently present in the temporary, or fugacious, form? There is, and this most encouraging and pathognomonic evidence of a purely functional and temporary involvement of the central nervous system is the presence in the affected halves of the visual fields of bright, zigzag, "crisscross" lines constantly in rapid motion, constituting the so-called scintillating scotoma. The presence of this visual phenomenon will enable the practitioner to be certain of his position in giving a favorable prog-

nosis with assurance of a speedy recovery.

For any form of homonymous lateral hemianopsia to occur, whether organic or functional, there must be some involvement of certain structures of the brain, *on one side, and back of the optic commissure.* These structures are the optic tract, the central ganglia or primary optic centers, the internal capsule, the fibers of the optic radiation, and the cortical visual center in the occipital lobe of the cerebrum.

It is a well understood fact that, owing to the partial decussation of the fibers of the optic tracts at the optic commissure, each side of the brain supplies with visual sensation the corresponding, or homonymous, halves of the two retinae. Thus the right side of the brain supplies the right half of each retina, corresponding with the left half of the visual field of each eye, and vice versa in the case of the function of the left side of the brain. Assuming, therefore, a right sided brain involvement affecting any of the structures noted, there would result a partial, or complete, obliteration of the left half of the visual field of each eye, or a left homonymous hemianopsia. The opposite would be the case in left sided central involvement, in which condition there would be a *right homonymous hemianopsia.*

Should a sudden organic type of this affection occur, the lesion may be assumed to be a hemorrhage, or possibly an embolism.

In case of right, or left sided, hemianopsia of gradual development, and of the organic type, the lesion may be a tumor, a syphilitic or tubercular involvement, or a softening of the brain, affecting one or more of the central structures enumerated.

What, however, of the purely temporary, or fugacious, type of the affection, which in the very beginning may closely simulate the sudden organic form? What is its nature? What is its cause? This condition is without doubt of angioneurotic origin.[1] In short it seems to be induced by a temporary anemia of the cortical visual center in the occipital lobe of the cerebrum of one hemisphere, due to a vasomotor spasm of the branches of the posterior cerebral artery of that side.[2]

An interesting fact lurks in this explanation, namely, that when aphasic symptoms manifest themselves, the hemianopsia is right sided, showing a central involvement of the left cortex. In such case the vasomotor spasm has likewise involved the branches of the left middle cerebral artery supplying the speech center. I have time and time again noted this association of aphasia with a right homonymous hemianopsia of the type under discussion.

As a general thing, in the type of the affection under discussion, the lateral hemianopsia does not affect the central vision for an area of about 10° around the point of fixation. From the latest investigations, it seems determined that the portion of the cerebral cortex directly concerned in central vision, situated at the extreme posterior pole of the occipital lobe of the cerebrum, is supplied by both the posterior and middle cerebral arteries, whose branches interlace in this area. Consequently an involvement of the posterior cerebral artery, or its distribution, would not entirely deprive this portion of the cortical area referred to of its arterial supply, since the branches of the middle cerebral artery would furnish such.

In case, however, of a simultaneous involvement of the middle cerebral artery as well, the line separating the sensitive and insensitive portions of each retina might be expected to pass thru the point of fixation. This is very prone to happen in the cases of right homonymous hemianopsia accompanied by aphasic symptoms, in which both the posterior and middle cerebral arteries of the left side are involved in the vasomotor spasm. The late investigations referred to (Gordon Holmes and Sir William Lister) seem to refute the former idea that "each macula is represented in each cerebral cortex, right and left."

This vasomotor spasm is short lived, the attack lasting from one-half to three quarters of an hour, or longer, and may possibly be followed by headache of the migrainous type, tho this is not by any means a necessary sequence. As the attack begins to subside, the scintillating, shimmering lines gradually undergo a

thinning out, in an ever widening semicircular arrangement, from the center of the affected portion of the visual field, to the right in right hemianopsia, and to the left in the left sided variety, and finally disappear at the corresponding portion of the periphery. I have often studied this method of disappearance during attacks in my own person.

During these seizures, the ophthalmoscopic findings are negative, the fundus oculi on each side being normal with no contraction of the vessels. The amaurosis is purely central in origin. In these cases the pupillary reaction to light is perfect, showing that the circulatory disturbance is beyond the primary optic centers. Sometimes, tho not very frequently, the vasomotor constriction affects the cortex of the occipital lobes on both sides, and then the amaurosis is complete, involving the entire visual field of each eye. Here, too, the shimmering, scintillating lines when present, as is usually the case, and the unaffected pupillary light reaction on both sides, will bespeak the harmless, temporary, type of the affection, and enable the medical attendant to give much needed comfort to the alarmed victim.

It is true that a sudden complete amaurosis, as described, without the scintillations, and with the pupillary reaction to light intact, might as a remote possibility, be caused by simultaneous, and similar hemorrhages in the neighborhood of the cortical visual centers, or involving the optic radiations, on both sides, but the chances of such a symmetric double hemorrhagic occurrence would be so infinitesimal as to be unworthy of consideration, and other symptoms, in such a case, would be present.

The medical attendant, therefore, may safely consider a sudden bilateral amaurosis, with the retention of the pupillary reaction to light in each eye, as of the angioneurotic type, and if, at the same time, scintillations should be present in the visual fields, he need have no doubt of the correctness of his diagnosis. In these less frequent cases of sudden complete fugacious amaurosis in both eyes, one must be on his guard against the possibility of the affection being due to uremia, or to hysteria, but this possibility need not long embarrass the skilled diagnostician.

Attacks of fugacious homonymous hemianopsia are very closely related to *migraine*, in fact the kinship is so marked that the suspicion may well be entertained that the two affections, if two there are, have the same basic pathology, and that the same treatment would be applicable to both. These attacks have a marked tendency to recurrence.

In considering the nature of functional homonymous hemianopsia, the socalled relationship between it and epilepsy does not, in my opinion, exist. I have never seen such attacks in the case of an epileptic, have never known a victim of such seizures to become an epileptic afterward, and have never met with a case from an epileptic family. Moreover, this affection is of very common occurrence, while epilepsy is a comparatively rare disease.[3]

Assuming the angioneurotic character of the form of hemianopsia under discussion to be a pathologic fact, to what may the causative vasomotor constriction be attributed? The chief causes are first, reflex irritation induced by asthenopia of both the refractive and muscular types in persons of high strung, nervous temperament, and, secondly, a state of toxemia, in similar individuals, resulting from intestinal and hepatic autointoxication, or from some focus of infection pertaining to the teeth, the tonsils, or the accessory sinuses of the nose.

Medical literature is singularly silent upon the causative agency of the group of infective sources referred to, but the writer has been impressed with the importance of such sources in this regard for many years, in studying the cases of victims of recurring attacks of the affection in question.

One can no more explain why a state of toxemia, from whatever source, may in certain nervously susceptible individuals induce a temporary vasomotor spasm of the arterial branches supplying a limited area of the brain, than can he account for the occurrence of arthritis, iritis, serous uveitis, optic neuritis, ulcerative keratitis, myocarditis, endocarditis, or acute nephritis, in as many different individuals under similar conditions of infection. It is reasonable to suppose—

and such supposition is not at variance with good pathologic precedent—that a basic nervous susceptibility must be present in the victims of these hemianopsic attacks, the irritation produced by the toxins in the blood stream exciting the vasomotor constriction in such fertile soil.

TREATMENT.—The treatment of the condition under discussion is a practical adaptation of medical and surgical principles to the correction, or alleviation, of the pathologic states outlined. Such treatment may be considered as of two types, namely, therapeutic means to cut short the immediate attack, and optical therapeutic, and surgical measures to remove the ultimate, or essential, causes of the seizures, and thus prevent their recurrence.

1. To cut short the immediate attack. To secure this end one must make use of remedies to relieve the temporary anemia of the cerebral cortex due to arterial spasm. The diffusible stimulants are of practical value in this regard, the aromatic spirits of ammonia being one of the most efficient drugs of this class. Remedies of the nitrit group. as nitrit of amyl and nitroglycerin, are of decided value from their well known property of dilating the peripheral arterioles thruout the body, in the brain as well as elsewhere. An objection to the administration of these latter remedies might be found in the possibility that the subsequent headache, which occurs at times in certain cases of scotoma scintillans of the migrainous type, might be made more severe by their use in consequence of their vasodilator effect.

2. To prevent the recurrence of the attacks by removing the essential cause, or causes, one must bear in mind the indications before referred to, and adapt the treatment accordingly.

(a) All source of reflex nervous irritation induced by errors of refraction, or by states of heterophoria, must be removed by careful correction of these anomalies, both refractive and muscular.

(b) Persistent efforts to eliminate autointoxications of intestinal and hepatic origin must be made.

Intestinal putrefaction, by furnishing bodies of highly toxic character from the "putrefactive disassimilation of the albumins" of the food, is of great importance in the production of intestinal toxemias. It is needless to say that the "degradation products" of the carbohydrates and fats play a very insignificant part in intestinal autointoxication.

Hepatic toxemias are very closely associated with those of intestinal origin. In consequence of the flooding of the liver with these toxic putrefactive bodies from the intestine thru the portal circulation, this organ is irritated, and its highly important functions injuriously affected to a commensurate degree. The secretion of healthy bile, for instance, is interfered with, the resulting loss of its antiseptic properties in the intestines still further complicating the case, and the highly important disintoxicating function of the liver, by which it renders innocuous the toxic principles emanating from the intestinal canal, is seriously compromised.

As a result in such causes, the general circulation is temporarily flooded with toxins, and in the susceptible individual, in whose central nervous system there resides this tendency, there may result the localized vasomotor constriction in the cerebral cortex responsible for the attacks of hemianopsia described. Three lines of treatment of intestinal and hepatic toxemias are indicated, which in a paper of the scope of the present one, can be given mere mention, namely: The use of intestinal antiseptics and mild saline aperients; the administration of remedies to stimulate the disintoxicating and cholegenic functions of the liver, sodium salts of the biliary acids, as glycocholat and taurocholat of this base, being especially valuable; and a careful regulation of the diet to the extent of lessening, as far as possible, the albumin component (Croftan). It is needless to say that all alcoholic liquors must be rigidly interdicted.

(c) The types of toxemia resulting from such *foci of infection* as the tonsils, the teeth, and the accessory sinuses of the nose, are frequent causes of the form of temporary hemianopsia furnishing the title of this paper. The authorities in the science of ophthalmology, to whose dictum we are so prone to bow, and to whose negative omissions we are so ready to attach a positive importance, seem, in great part, to have overlooked

the causative relation of purely toxemic states to angioneurotic occurrences in the brain. That such causes can be, and are, responsible for attacks of scotoma scintillans—and of true migraine as well—in certain instances, I am ready to affirm upon the authority of practical experience and results.

The writer would, therefore, earnestly advise in these troublesome, discouraging, recurring cases of temporary homonymous hemianopsia—and in true migraine as well—that the general medical attendant, oculist, or neurologist should have the hepatic and intestinal functions passed in review, in accordance with the teachings of modern internal medicine; and, at the same time, should direct the most careful attention to the state of the teeth, of the tonsils, and of the accessory sinuses of the nose.

Proper treatment, and effective radical surgical measures, when such infective foci are found, will in many instances, be followed by most striking and happy results.

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NOTES, CASES, INSTRUMENTS

THROMBOSIS OF THE CENTRAL RETINAL VEIN.

HILLIARD WOOD, M. D.

NASHVILLE TENN.

Case presented to the Nashville Academy of Ophthalmology and Oto-Laryngology. For discussion see page 421.

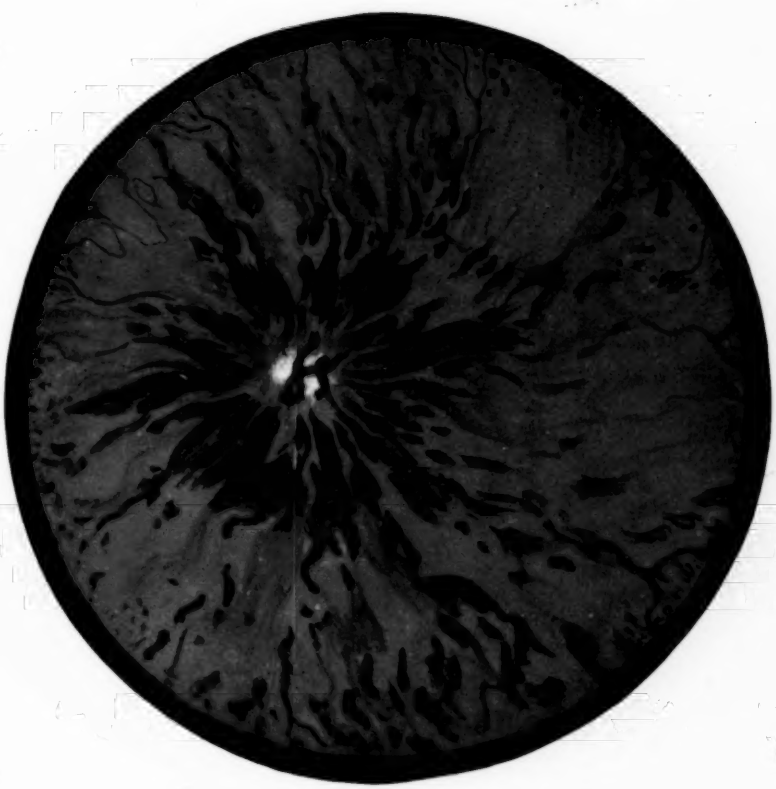
O. V. B., age 40, was first seen on December 4, 1922, giving the following history: Recurrent tonsillitis for six years. Rheumatism. Impaired hearing. Alternating nasal stenosis. Weakness of left eye, with impaired vision for two to four weeks.

Examination: Right eye: Vision = 20/15. Left eye: Vision = 20/50. Accepts no lenses. Right eye: Shows no fundus changes. Left eye: After homatropin, fundus shows violent hemorrhagic neuroretinitis; innumerable hemorrhages extending from the optic disc, as for forward in every meridian as can be seen. No choked disc.

Moderate hypertrophy of each inferior turbinate. Septum normal. Frontal sinuses transilluminate normally. Each antrum shows relative shadow. Right antrum irrigated, and 15 to 20 drops of pus washed out. Left antrum irrigated and no pus found. Postrhinoscopy shows no pathology. Faucial tonsils septic. Advised tonsillectomy. Urine clear; amber; no albumin; no sugar. Blood pressure: 150-100. Advised tonsillectomy, opening right antrum, Wassermann, and repeated urinalysis.

Treatment: Tonsillectomy under local anesthesia. Dec. 6, Wassermann and urinalysis negative. Dec. 7, R. E. Vision = 20/15. L. E. Vision = 20/30. Fundus same as above. Right anterior inferior turbinotomy and trephined opening into right antrum. Trephine opening enlarged. Dec. 18, R. E. Vision = 20/15. L. E. Vision = 20/100 + 0.50 D. S. V. = 20/50. Left eye shows no fresh hemorrhages since treatment was begun, and possibly some absorption of blood of former hemorrhages. Urinalysis: 1020, acid, no albumin, no sugar.

Dec. 29, 1922. R. E. Vision = 20/15. L. E. Vision = 20/100 + 0.50 D. S. Vision=20/65-1. Feb. 12, 1923, R. E. Vision = 20/15. Accepts no lens. L. E. Vision = Fingers 2 ft. Pupil dilated. R. E.: Ophthalmoscopic examination shows no fundus or other changes; no arteriosclerosis; no corkscrew arteries; no hemorrhages; no exudates. L. E. shows numbers of fresh hemorrhages, especially towards equator. Old hemorrhages are taking



THROMBOSIS OF CENTRAL VEIN OF RETINA, (DR. WOOD'S CASE)

on a whitish color. Sections of retinal arteries and veins seen here and there. Veins are very much engorged and tortuous. Tension 18 1/2 mm. Hg. The case is one of thrombosis of the central vein of the retina. Antra and frontal sinuses seem normal.

From the findings and history it is probable that the pathology in the left retina was due to focal infection, either from the tonsils or right antrum or both, as no other cause has been discovered for it, and as there is no evidence of vascular or other degenerative changes in the right eye. It is believed that the right eye will remain good and that the left eye will remain bad.

ASSOCIATED MOVEMENTS OF UPPER LID AND JAW.

CHARLES J. ADAMS, M. D.

KOKOMO, INDIANA.

Miss M. W., school girl, 13 years old, first seen by me Dec. 9, 1922. Family history negative. Only illness of any consequence a slight attack of measles three or four years ago. Parents state that early in the child's life, when she first began to feed herself, as she looked down and opened her mouth the left upper eyelid was pulled upward, so that the palpebral opening was twice as wide in the left eye as in the right. They also noticed, that after the initial increase of the opening the left upper lid made a slight up and down movement synchronously with the jaw, as long as she looked down. They are quite positive that there has not been any change in these associated movements up to the present time.

Examinations: Pupils 4 mm. in diameter; react normally and equally to light and distance. The size of neither pupil changes at any time, and the associated movements of the eyelid and jaw do not affect them. There is no spontaneous nystagmus and the ocular movements are equal and normal. There are ten diopters of accommodation in each eye. Convergence near point 6 cm. The face is symmetric and is not abnormally affected during the anomalous movements of the eyelid.

I found that it did not matter whether she looked straight down, down and to the right or down and to the left, the result was the same. The slight upward movement of the lid occurs as the jaw opens, and appears to be due to increased effort on the part of the levator palpebrae superioris, to widen still further the palpebral opening. The slight downward movement that follows as the jaw closes seems to be relaxation of this extra effort. This movement increases when she chews with greater vigor; also when she is very nervous, particularly after she has been crying following a correction by her parents. The width of the palpebral opening is maintained until the patient either ceases chewing, or looks up, when the palpebral fissure becomes the same width as that of the right eye.

REBOUNDING INTRAOCULAR FOREIGN BODY.

WARREN S. REESE, M.D., F.A.C.S.

PHILADELPHIA.

T.F.D., male, age 28, gave history of having been struck in the left eye three years ago by a hand grenade fragment.

External examination reveals no evidence of injury. On dilating the pupil, a localized opacity of the lens can be seen in the extreme nasal periphery. From this point a rather wide, silvery, funnel shaped band extends backwards thru the vitreous and expands into an area of choroiditis just up and in from the disc. In the lower nasal periphery there is a localized serous detachment of the retina.

An X-ray taken at Wills Hospital by Dr. Young, localized the foreign body in the horizontal plane, 6 mm. back of the center of the cornea, and 8.5 mm. to the nasal side. Size IxIxI mm.

Refraction: O.S. — 2.50 sph. ⊃ + 6.00 cyl. ax. 90 = 15/20.

Comment: The foreign body apparently entered the left eye just to the nasal side of the limbus at three o'clock, traversed the vitreous, rebounded on striking the globe posteriorly, retraced its path thru the vitreous and lodged near its point of entry. Fuchs cited such a case in his

recent course of lectures. The vitreous band probably resulted from the marked disturbance incident to the double passage of the foreign body, and the contraction of this band was very likely the cause of the high mixed astigmatism. It is rather remarkable that the man should have such good corrected vision.

HICCOUGH FOLLOWED BY LOSS OF VISION

JULIUS H. GROSS, M.D.

ST. LOUIS.

Read before St. Louis Ophthalmic Society.

F. M., a man of 72 years, handy man in a St. Louis tobacco factory, consulted me some time ago. History was negative, except that he had rheumatism and then had high blood pressure. Urine about normal.

A month before consulting me the patient had an attack of hiccough, the cause for which has not been determined. For eleven days the patient had a constant hiccough, except when he managed to sleep for an hour or so. Two physicians were unable to give any relief. The patient still feels that he was in danger of dying of suffocation during the attack. At times the paroxysms were so severe that he could not breathe. His physician was considering the advisability of administering chloroform to produce general anesthesia, when the hiccough ceased.

About eight days after the hiccough began, he noticed a sudden failure of the vision in the left eye. When first seen (March 19, 1922,) vision was R. E. 18/15; L. E., count fingers at 3 feet. Both fields were good. Color perception good. Pupils reacted well to direct light. The left pupil did not respond so well to indirect light. Both contracted in accommodation. Ophthalmoscope showed the left fundus to be normal, except that the retinal arteries were smaller, and the veins more filled than normal.

The disc was somewhat paler. On the supposition that a hemorrhage had taken place at some point posterior to the globe, the patient was given ten drops of saturated solution of potassium iodid, three times a day after meals. On March 27th (one week later) the vision had risen to 3/75. Fields good, except that the blind spot is somewhat enlarged. On April 29th (one month later) V. O. S., 3/24 or 18/240.

I assume that the persistent hiccough increased the patient's blood pressure, which already was high, and that a blood vessel ruptured, the resulting hemorrhage causing pressure on the optic nerve just posterior to the globe.

BUTYN AS A LOCAL ANESTHETIC IN MINOR SURGICAL OCULAR OPERATIONS.

EARL L. VERNON, M.D.

CHICAGO, ILLINOIS.

I wish to report the record of one hundred patients anesthetized locally with a two per cent solution of butyn for the purpose of removing superficially lodged foreign bodies of the cornea, application of caustic or irritating substances, chalazion tumor operations, suturing eyelids after injuries, quick dilatation of the lacrimal canal by instrumentation, amputation of herniated iris after accidents and for other minor surgical operations of the eye, including its use for examination after penetrating wounds, burns and the like.

Patients chosen for data in this report were taken in as near a numerical order as possible, according to whether or not sufficient time could be taken to make necessary observations and record proper data as they were referred to me, the result of an accidental injury. The greatest number consisted of patients with one or more foreign bodies lodged in the cornea. All were so deeply lodged that it took a spud or some similar instrument to remove them. Some were removed with the aid of the magnet. It includes none so trivial that irrigation would dislodge them.

Some came immediately after the accident and received first aid, others after first aid had been received elsewhere, some were referred for ex-

amination only. Many in the latter class had received no treatment, altho considerable time had ofttimes elapsed since the accident.

Needless to say, these data were obtained from observations made on patients from the working class, and, therefore, naturally composed of persons of varying temperaments. Each operation represents a different patient. For instance, soon after I began to remove a very superficially lodged foreign body from his cornea, one patient developed a typical attack of epilepsy, altho I had used a sufficient amount of butyn solution to produce perfect anesthesia; at least he denied pain during the operation. Five others fainted outright, and six, with no worse than a foreign body in the cornea, acted badly, claiming extreme sensitiveness, incapability of remaining quiet, and to experience actual pain during the operation. I may say that, in my opinion, the latter ones acted out of all proportions to the severity of the case, and should undoubtedly be placed in that small list of cases incapable of being anesthetized because of fear. Aside from those instances, anesthesia was quite satisfacory in every case.

In medicine, as in everything, a standard of measurement of some kind must exist, or be established, as a guide or unit of comparison. So in drugs, since the discovery of its anesthetic power by Koller in 1884, cocain has retained its place as the anesthetic of election with the majority of ophthalmic surgeons the world over; notwithstanding many similar drugs have been produced with the idea of finding one superior. Those which have been advanced from time to time as substitutes for cocain for local anesthetic purposes in ophthalmic surgery are holocain, aneson, tropacocain, alypin, yohimbin, eucain, acoin, stovain, novocain, frynin and butyn.

The first named drug of the group was offered as a substitute for cocain in 1896. The advantages claimed for holocain were, it was somewhat antiseptic in its action, had slight effect on corneal epithelium, its efficacy was undiminished by boiling, and had no effect on the pupil. The disadvantages claimed for it were, it was much more irritating and much more painful than cocain, and did not produce anesthesia of the deeper structures of the eye.

Each above named drug could be taken up separately, outlining the advantages and disadvantages, but that is not the object of this paper, and it is not the purpose of the writer to do so; suffice to say that none of them are faultless, and, because of that fact, cocain still retains its place of preference. Therefore, using cocain as a standard for comparison, it is my wish to briefly call your attention to its action when instilled into the eye for anesthetic purposes.

From two to four per cent solution seems to be about the percentage universally used in this country. Ordinarily, within two minutes after having been instilled into the conjunctival sac, the eye is sufficiently anesthetized to permit the removal of superficially placed foreign bodies on the cornea, allow satisfactory inspection or the application of irritating substances to the eyeball. Surgical anesthesia, however, is not usually established so quickly.

The anesthetic action of cocain on the tissues is due to its paralyzing action on the sensory nerve endings, and for that reason local anesthesia is more perfect in the eye than in any other organ of the body, because of the large sensory nerve endings found in it.

When anesthesia of the deeper structures is desired, it is obtained by infiltration of the drug thru the intercement substance. With the beginning of this deeper anesthesia, mydriasis develops and cycloplegia occurs. Mydriasis is accomplished by the action of cocain on the sympathetic nerve that supplies the iris. During still deeper stages of anesthesia, widening of the palpebral interspace takes place. This is because of the action of the drug on Müller's muscle. Therefore, when butyn or any of the drugs used as a substitute for cocain as a local anesthetic in ophthalmic surgery is instilled into the eye, absorption is carried out in a similar manner to that of cocain, even tho its action is not identical.

For my observations, I used a two per cent solution made from butyn tablets. Of the various purchases, all tablets were slowly soluble in hot water. Four instillations, with three minute intervals, waiting five or ten minutes after the last drop before beginning the operation, constituted my technic.

Immediately following the first drop in the eye, marked hyperemia occurred, and with it increased lacrimation. At no time during these observations did dryness of the cornea occur, as is common when cocain is used. It had no action on the pupil. No patient complained of discomfort from cycloplegic effect. Butyn served me especially well in five of these cases mentioned. They were highly specialized workmen with but one eye, and it so happened that each man should be immediately returned to his work with the least possible interference of vision. As far as I was able to determine, there was no action of the drug on Müller's muscle, producing any perceptible widening of the palpebral interspace. Lacrimation seemed to be increased when the solution was instilled, and in some cases proved rather annoying to the patient as well as to myself. There was no complaint or evidence of disiccation or delayed healing of the cornea resulting from the use of the butyn solution. Whether or not a stronger solution, or use of the powder, will produce such a condition, I am not prepared to state; as my experience has only to deal with the two per cent solution used as above described.

The number of instillations necessary to obtain a satisfactory anesthesia in a given case would depend on the nature of the operation contemplated, and somewhat on the temperament of the patient. Four instillations, with three minute intervals, beginning the operation five to ten minutes after the last drop, seemed to me to be the necessary amount for perfect anesthesia in the patients operated and recorded for this report. When a less amount was used, unsatisfactory anesthesia was often the result.

In the half dozen patients who fainted, I would not presume to attribute it to the toxic action of the drug, neither would I attribute the epileptic seizure to it. In other words, in my opinion, there was no perceptible toxicity due to the action of butyn, in any of the one hundred patients.

CONCLUSIONS.

1. Butyn is more expensive than cocain.
2. It produces hyperemia, while cocain produces ischemia.
3. It has no action on the pupil.
4. Produces as good or better anesthesia.
5. No effect on the corneal epithelium.
6. Four instillations of a 2% solution produces satisfactory anesthesia for all minor ophthalmic operations.
7. Tablets quite slowly soluble, even in sterile hot water.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly scientific papers and discussions, include date of the meeting and should be signed by the Reporter or Secretary. Complete papers should not be included in such reports; but should be promptly sent to the Editor, as read before the Society.

SOCIÉTÉ D'OPHTALMOLOGIE DE PARIS.

July 22, 1922.

DR. POLACK, President.

Veins on Anterior Surface of Iris.

DR. P. BAILLIART presented a case of a venous plexus visible on the anterior surface of the iris. A man of 74 had central scotoma of the left eye from macular lesions. The right eye had been losing vision for 6 months, with increased tension. A network of veins was distinctly visible on the anterior surface of the iris. The subconjunctival veins were also enlarged, especially near the insertion of the recti. The tonometer showed tension of about 60 mm. Hg.

Preretinal Hemorrhages in Pregnancy.

DR. R. ONFRAY presented a woman, aged 23, primipara, 8 months pregnant; who, after long exposure to the sun, noticed impaired vision in L. which continued when examined ten days later. The pupil reflex was preserved, but there was absolute central scotoma with normal periphery of the field. An area of hemorrhage 2 or 3 dd. in extent was found at the posterior pole of the eye. The general and local blood pressure were about normal, and renal function not much disturbed. Vision gradually returned and the scotoma became paracentral.

Temporal Hemiachromatopsia.

DRS. V. MORAX and J. BOLLACK reported two cases in which hemiachromatospia was observed. A woman of 42 had suffered greatly from headache, diminished in the last two years. Her eyes were otherwise normal, with full peripheral fields for form. She presented bitemporal central scotoma, extending 10 degrees from the point of fixation and bitemporal hemiachromatopsia for all colors. By radiography the sella turcica was found enlarged anteroposteriorly, with loss of the posterior clinoid processes. Under radiotherapy of the hypophysis, the vision improved and the scotomas disappeared, but the hemiachromatopsia persisted.

The other patient was a woman of 30. Vision was impaired, first in the left and then in the right eye, until in the latter it was lost completely. There was contraction of the temporal fields for red and green; central vision was normal.

Ocular Lesions after Spinal Anesthesia.

DRS. MONTHUS and DRÉCOURT reported a case of temporary amaurosis and hemianopsia and two cases of abducens paralysis, following spinal anesthesia. Of the patients with abducens paralysis, one was a woman of 36 on whom total abdominal hysterectomy had been done. The paralysis remained five weeks after operation. The other patient, a woman of 40, had also undergone hysterectomy for salpingitis and fibroma. At the end of the operation she seemed entirely blind. Her pupils were dilated and did not react to light. This condition continued 18 days, and was followed by left homonymous hemianopsia and aphasia. A man of 43, operated on for gastric ulcer, suffered paralysis of the sixth nerves without other ocular disturbance.

MEETING OF OCTOBER 21, 1922.

Keratoconjunctivitis Cured by Autovaccine, Staphylococcus.

DRS. BOUSSI and VEIL reported from the Clinic of Dr. Poulard the case of a girl of 14, who had suffered from keratoconjunctivitis which did not yield to varied and prolonged treatment. There was diffuse infiltration of the cornea, with erosion and ciliary injection. There were enlarged glands, submaxillary, axillary and inguinal. Injections of milk were tried but improvement began after an autovaccine

of staphylococcus (5,000,000 germs) was injected in the side about twice a week until thirteen doses were given. There was usually no reaction, but three injections were followed by erythema and some discomfort for 48 hours. The cure seemed to be complete after the fourth injection, but enlargement of the glands remained. The girl was sent to the seaside and returned after four months without any recurrence.

Discussion.—Dr. F. Terrien had seen a persistent keratoconjunctivitis with iritis completely relieved by two injections of antidiphtheritic serum.

Dr. V. Morax, in a girl of 9 years suffering from eczema, superficial corneal ulceration, blepharospasm and photophobia, saw great improvement the next day after injection of 0.1 cgm. of novarsenobenzol. The Wassermann reaction was negative and nothing indicated syphilis.

Associated Movements of Upper Lid and Jaw.

Dr. J. Bollack reported the case of a girl of 13 with ptosis from birth, in whom movements of the lid occurred with mastication. The frontal muscle was used in raising the lid; each depression of the jaw was accompanied by an elevation of the upper lid. The lateral movements and convergence were normal, the elevation of the right eye limited by weakness of the right superior rectus. Electric stimulation of the mylohyoid caused opening of the mouth and elevation of the corresponding lid but no movement of the eyeball.

Large Unsuspected Foreign Body in Ethmoid and Orbit.

Dr. V. Morax reported the case of a woman, aged 48, who had suffered for a dozen years from pain and periodic impairment of vision at intervals of six months or more, the attacks lasting three or four weeks. An X-ray plate showed the presence of a needle passing obliquely from the upper nose into the apex of the orbit. An attempt to remove the foreign body thru the nose was not successful. Under novocain anesthesia, an incision was made in the upper orbital and nasal region. The orbital portion of the needle was found well back in the orbit. But it was not extracted.

Under general anesthesia the right side of the nose was opened externally, the lacrimal sac displaced and a portion of the superior maxilla resected. In the ethmoid a blackish area indicated the anterior extremity of the foreign body. The needle was finally extracted in three fragments, having a total length of 55 mm. On close questioning the patient remembered that 12 years before, and 9 months preceding the first attack of pain in the region, she had fallen from steps, her head striking on a straw mat. She was unconscious a quarter of an hour, but had little trouble from the fall, other than swelling of the left side of the head. There was no hemorrhage from the face or nose and no other symptom to attract attention. In 2 or 3 days she seemed to have recovered. The needle was completely oxidized, and the surrounding tissues stained by it. Subsequent radiographic examination showed the foreign body had been entirely removed. The pain and the disturbance of vision entirely disappeared.

Discussion. Dr. Rochon-Duvigneaud had seen a woman of 35 employed during the war in a munitions factory, who complained of exophthalmos lasting several months, with turning of the eye out, but with preservation of movement. There was swelling of the nasal portion of the orbit but little pain. On incision, an irregular piece of bone the size of a nut was found and readily removed. It was not a sequestrum or part of the human skeleton. It was believed to have been projected into the posterior opening of the nasal fossa, during an effort of coughing. Cureting of the ethmoid was followed by rapid and complete cure.

Histology of Persistent Pupillary Membrane.

F. Terrien and J. Mawas add one to three previously reported microscopic examinations of such a structure. They find that it is closely comparable to the iris, possessing the same elements except no differentia-

tion into the pupillary sphincter and dilatator. In their case it was richly supplied with vessels, and there was no deformity indicating atrophy or intrauterine inflammation. In this case the tissue was extracted from the living eye after use of a miotic, which caused it to bow forward from its insertion on the anterior surface of the iris. The cornea was opened with a Graefe knife introduced at the external margin, to cut downward. The point easily engaged the pupillary membrane. The adhesions to the iris being divided with the knife, the membrane was easily extracted with curved iris forceps, leaving a round pupil.

Encysted Hemorrhage of Lower Conjunctival Culdesac.

J. GALLOIS saw a boy of 6 who presented a painless swelling of the lower lid. Examination of the conjunctiva showed a mass, the form, size and color of an olive, in the lower culdesac, extending from near the outer canthus almost to the caruncle. It slightly fluctuated, its wall seemed clear, colorless, with some fine vessels. Puncture allowed the escape of coffee colored fluid, evidently the remains of a hemorrhage.

Retinocytoma (Glioma of Retina).

M. J. MAWAS, from a microscopic study of the cytology of more than ten cases of socalled glioma of the retina, has reached the conclusion there is but one species of tumor arising in the retina; that it is highly malignant, is epithelial in origin and significance, and made up of retinal cells of embryonic type which arise in the proliferating perivascular zone. He believes that the tumors described in the literature as glioma, neuroepithelioma, fibroglioma, gliosarcoma, cylindroglioma, ossifying sarcoma, ganglionic neuroma and neuroglioma, tubular angiosarcoma and small round cell sarcoma, etc., are really of the same character. The variations in their description have risen from faulty technic, a narrow view of them and an outgrown nomenclature.

He suggests that the name *retinocytoma* should replace glioma. True glioma arises from the glial tissue, with which these tumors have nothing in common. For the socalled rosettes, first described by Flexner in 1891 and brought to general notice by Wintersteiner, he suggests the phrase "cell wreaths," or "crowns," this phrase being free from liability to confusion. As to the neuroglial supporting tissue of retinocytoma, he points out that staining by silver nitrat does not settle the histologic significance of such fibrils. By a simple technic, to be described later, he has studied the structure of this supporting network of fibrils. They may be compared with the supporting fibrils of the normal retina and fixed and colored in the same manner. To describe the supposed method of their origin; the full name Mawas would give to such tumors is *dysembryoplastic retinocytoma.*

Modifications of Aqueous After Ligature of Carotid.

A. MAGITOT and Y. DAUTREVAUX reported the results of experiments made on rabbits, cats and dogs, care being taken to select normal animals in which the tension of the two eyes was the same. It had been shown before, that after ligature of the carotid, the tension reduced by puncture of the eyeball is very slowly recovered. The first aqueous obtained by puncture after ligature showed a slight diminution of albumin, about 6 or 7 cgm. in one thousand. The chlorides were also slightly reduced. After 50 minutes, however, there was a little augmentation.

In general a second aqueous shows the albumin increased, the increase reaching a maximum about 3 hours after the first puncture. This second aqueous, from an eye on the side of the ligated carotid, contained much less albumin, especially from 35 to 60 minutes after the first puncture. However, it contained so much fibrinogen that coagulation occurred in it very quickly. But in the eye of the side ligated it occurs more slowly. A fall in the proportion of albumin is a constant phenomenon, altho the amount varies and the time of its duration. The same is true of the chlorides in the aqueous. The difference in the quantity of albumin in the second aqueous on the side of the ligated carotid, was perceptible 20 hours after the death of the animal by a bleeding, done immediately after the second puncture.

ROYAL SOCIETY OF MEDICINE (LONDON).

Section of Ophthalmology.

January 12th, 1923.

MR. A. L. WHITEHEAD, President.

Retinitis Pigmentosa sine Pigmento.

MR. J. A. VALENTINE showed an instance of this condition in a man, aged 26, who complained that his sight had been failing since 1915. Vision in the right eye 6/9, in the left 6/12. There was 1 D. of hypermetropia on right and left sides. Ring scotomas were present. The pupillary reactions were normal, and the media clear. The discs showed pallor, and indistinct margins. In order to find his way about at night, he had to look closely on the ground, probably due to the contraction of his central visual field.

Discussion.—THE PRESIDENT said that what struck him most about the case was the appearance of the discs. Choroidal changes round the periphery were marked; there was no tendency to the waxy appearance one was accustomed to see, even in the early stages of retinitis pigmentosa.

Amaurotic Family Idiocy.

MR. A. LEVY showed a baby, aged 19 months, with this condition. The parents and grandparents were not Jewish, but pure English. The parents were related before marriage; first cousins. The child had a good deal of spastic paralysis, had the characteristic cry, and had never learned to eat, nor to sit up by itself. The anterior fontanelle was widely open, and the patient had been wasting for some months.

Discussion.—MR. TREACHER COLLINS reminded members that Sir Frederick Mott had pointed out that the ganglion cells of the whole body, even of the sympathetic system, were affected in this disease.

Maculo-Cerebral Degeneration.

MR. MONTAGUE HINE brought forward two cases (in brothers) of maculo-cerebral degeneration. He saw the eldest boy three years ago, when he was 16 years of age. He commenced to have epileptic fits when he was 10 years old. These were treated. His vision was then found to be defective, but when he had been fitted with glasses it was still bad. The exhibitor then saw that his maculae were very finely granular. Dr. Gordon Holmes agreed with the diagnosis of maculo-cerebral degeneration. There was no syphilis, or consanguinity in the parents. Today his mentality was seen to be very sluggish, and he had some paralysis, and incontinence of urine.

The patient's brother was brought for an opinion as to whether he had anything wrong with him. Vision was 6/12 in each eye. Both his maculae were finely granular. In October he started to have fits; they started at the same age as they had in his brother. The fits had continued at intervals since, and this patient seemed to be going the same way as his elder brother just referred to.

Discussion.—DR. RAYNER BATTEN agreed with the diagnosis, believing that the cases belonged to the juvenile class, not the infantile. In one class, pigmentation occurred without cerebral symptoms.

Polycythemia, with Visual Defect.

MR. P. BARDSLEY showed a case of this condition in a young theologic student, who was unable to concentrate more than four hours a day, and suffered also from physical fatigue. His red cells numbered 7,600,000 per c.c., and the color index was slightly diminished. During the three years he served in the Army his condition was normal, and he was classed A 1. A physician had told him that venesection to about 30 ozs. every few months was the only real treatment.

Hole in the Hyaloid.

MR. LINDSAY RAE showed a case of this condition. He said that when he first saw the patient, three years, ago, the vitreous was opaque with opacities. Wassermann was strongly positive. After the syphilis had been treated, by injections followed by mercury and iodid of potassium, the vitreous bodies began to clear, and a ring was seen in front of the optic disc. Sir William Lister said he considered it a true case of hole in the hyaloid.

Discussion.—Mr. Treacher Collins said there could be little doubt that in this case the vitreous was torn away from the optic disc, and where that happened there had been left the circular hole which had been described.

Mr. Gilblett described two cases of the condition he had seen recently at the Ministry of Pensions; in each of those patients the hole was four times the diameter of that in Mr. Rae's case.

Neuroretinitis with Detachment of Retina.

Mr. Rae also showed a patient with this condition, which had probably been started by a septic focus in the teeth, as that was the only abnormality which could be found. Vision had fallen to 1/60, but today it was 6/36, and no macular degeneration could be seen. She had been to the seaside for six months, and had had inunction of mercury ointment and the internal administration of iodid of potassium. Vision was, as stated, now 6/36, and there was an improvement all round.

Results of Cataract Extractions.

Mr. Harrison Butler read a paper relating some curious operative results after the operation of cataract extraction.

The Treatment of Conical Cornea.

Mr. Charles Killick (Bradford) read a paper on this subject. He said he believed that keratoconus was not often seen in its earlier stages, but in strenuous work slight cases could easily be overlooked. Where doubt existed, there should be a more frequent use of Placido's disc. His own experience of the condition had been when it presented a definite cone in each eye, when there was an opacity at the apex in one or both eyes, and when the vision was much reduced, usually below 6/60, tho it might be improved to 6/24 by looking thru a small aperture and by adding concave lenses. Sometimes unilateral cases were seen. One such developed suddenly in a lady, and did not vary over a period of several years. Death eventually was due to chronic tuberculosis.

Treatment was almost always a question of surgical interference. Women were by far the more frequent sufferers from it. Of his six last cases, five were in women, including two pairs of sisters and a mental defect. The male was well developed, and had never had good sight. He, and one of the females, had marked peripheral cataractous changes in both lenses. There seemed to be a tendency for it to occur in families. There had seldom been opportunities of microscopically examining eyes with keratoconus, but Parsons stated that Bowman's membrane was intact, but was thinned and wrinkled, Descemet's membrane being unchanged. Parsons gave the following main theories as to causation: Relative increase of intraocular tension; malnutrition of the cornea, or inherent weakness of it; defective embryologic development; disease of Descemet's membrane and epithelium. Ulceration or rupture of the cone had not been observed. The cornea was much thinned, and might be reduced to one-third of the normal. The great difficulty was as to how to treat such an obstinate malady.

The late Mr. Charles Wray said that in the early stages much might be done by general treatment, but the treatment laid down by him seemed too rigorous for hospital patients, and required long rest for the eyes. In advanced cases, tho general treatment could be added to the surgical, it could not be curative. The mental defect he did not attempt surgery on, and the young man declined it, therefore general treament had to be carried out, and this resolved itself into the application of a firm pressure bandage and the administration of a tonic. This resulted in restoration of almost complete corneal transparency in a short time. He had seen the same result from it in other cases too. But it did nothing to bring about flattening.

The chief operative methods were cauterization of the cornea, with or without its perforation, combined, if necessary, with optical iridectomy and tattooing, cauterization combined with sclerectomy, excision of the apex of the cone, or by extraction of the lens. He had had only a limited experience of Critchett's target operation. Terrien said that cauterization without perforation had never yielded him good

results. He, the author, quoted a case of his own in support of this, that of a nurse, whom he first saw in November, 1920. She was aged 24, and in good health, but her eyes had not been right for the past four years. Vision was bad, and she had well marked conical cornea in both eyes. He did first a sclerectomy in the right eye, to establish hypotony. It was followed by iritis, hypotony and a small macula on the cone apex, which soon disappeared as the eye recovered. The eye healed without leaving any obvious sign of fistulisation, and the corneal condition was not altered, nor vision improved. She returned to work, but eight months later came back asking for a further operation, as she could not see to do her work efficiently. The right eye had less than 6/60 vision, and the left with 7.00 = 6/36. He next tried the effect of performing the first stage of cataract extraction, making a large flap, in the hope that a pressure bandage and postoperative astigmatism might produce a beneficial result, but was again disappointed. Altogether six operations were performed, and later she was admitted to a sanatorium, with her sight very little better.

The following case, however, seemed to show that something better could be done. It was that of a married woman, aet. 49, who had conical cornea, but not so markedly as the last case. Her sight had been gradually failing for twelve years. She had never worn glasses. She had conical cornea in both eyes, with a small opacity on the apex of the right, and there were marked peripheral opacities in both lenses. Vision was less than 6/60, and was not improved by glasses. General treatment was first tried, but a year later, as there was no improvement and on account of the lenticular opacities, he decided on simple extraction, by the method of the subconjunctival bridge; the width of this bridge should be about one-third of the total incision. A good recovery ensued, and she was discharged after 9 days with a fair amount of after cataract. Later she was readmitted for discission to be carried out, and he suceeded in making an incision in the capsule about 1 mm. broad, and 1/2 c.m. long in the vertical diameter. He described the procedure in detail. Vision was found to be improved, and the patient left the hospital in September last with a quite transparent cornea, and was wearing —5.00 D. sphere, together with —1.00 cyl. axis horizontal, with which she could manage to read 6/24.

Discussion.—Mr. Elmore Brewerton described the operation he had carried out in his last six cases of conical cornea, namely, making a crucial incision thru the apex of the cone with a narrow Graefe knife, and two lateral incisions with scissors. The wound healed in two or three days, and there was a certain amount of flattening, the patient seeing over the center. One patient, a working girl on whom he did this, had 6/24 vision without glasses.

H. Dickinson.

PITTSBURGH OPHTHALMOLOGICAL SOCIETY.

December 11th, 1922.

Dr. E. B. Heckel, President.

Exudative Choroiditis.

Dr. Edward Stieren and Dr. George H. Shuman exhibited the case of G. C., male, age 10, who was referred by family physician on December 9th, 1919, for blindness in left eye. The condition had been discovered one or two days previously by the boy's public school teacher, who noticed him rubbing his left eye. On looking for a reason, she found the unusual appearance of the eye due to the abnormal pupillary reflex. At the first examination, the affected eye was normal in external appearance, except for a gray pupillary reflex; cornea and iris were normal; anterior chamber was of normal depth; aqueous, lens, and anterior vitreous were clear. Vision was nil. The pupil reacted to accommodation and to light consensually.

Focal and ophthalmoscopic examination, with the pupil dilated maximum with homatropin, showed the vitreous chamber to be filled for about two-thirds of its posterior portion with

an evenly distributed, grayish mass, cottony in apparent texture, with the anterior surface concaved as tho it conformed to the posterior tunic of the globe. Tension was normal and the same as that of the other eye to palpation. Transillumination gave a very faint, even shadow in all meridians. Personal history, as far as obtainable, was negative, except for measles and chickenpox during the preceding year. Right eye was free from any abnormality and had normal vision.

Diagnosis by Dr. Stieren was exudative choroiditis, with measles as the probable source of the metastasis. Patient reported for observation several times within the succeeding few months; there was no perceptible change in the condition of the eye during that period. He was not seen again until August of the present year, when he came for treatment of what was found to be a mild attack of phlyctenular keratoconjunctivitis. The condition of the left was then found to be as it presents at this time, i.e., a soft, shrunken, degenerated globe, with cataractous lens, atrophied iris, and an odd spot of dense, deep brown pigment, circular and sharply defined, on the anterior capsule of the lens, slightly below center. The right eye is negative and has normal vision.

We believe this to have been one of those rare cases of simple suppurative choroiditis, which Fuchs describes as running so sluggish a course as not to produce any external signs of inflammation, and which are so apt to be confounded with neoplasms in the eyeball that they have been designated pseudogliomata. The course of the disease subsequent to our first period of observation has made perfectly clear Dr. Stieren's diagnosis of three years ago, but at the time of our first examination differential diagnosis was, of course, a matter of great moment.

Monocular Nystagmus Following Muscle Advancement.

Dr. Fred C. Stahlman exhibited the case of Miss A. G., aged 17 years. She was first seen in 1913, when she came for divergent strabismus. Atropin cycloplegia revealed an error of refraction in each eye as follows: O.D., plus 2.75 D. S.; O.S., plus 3.00 D. S., combined with plus 0.25 Cyl. axis 90. In 1913, that is, when patient was eight years old, an advancement operation was done on the left internal rectus muscle. Following this, refraction was found to be: R. plus 2.75 D. S., which gave a vision of 6/6; L. plus 3.25 D. S., combined with plus 0.25 D. Cyl. axis 90°, which gave vision of 6/9 plus. Two years later, the same correction gave vision of 6/6?? in left eye. The eye was fairly straight, but there had developed a slight vertical nystagmus. In 1918, vision in each eye, with correcting lens, was 4/4??. One year later, the nystagmus in left eye was more marked and vision had dropped to form perception. There has been no perceptible pathology in the fundi at any time.

Discussion.—Dr. McMurray thought the advancement operation had no causal relationship with the nystagmus. Whatever has caused the loss of vision in the left eye has also caused the nystagmus.

Dr. Heckel would classify the case as one of nystagmoid movement of the left eye rather than pure nystagmus. Nystagmoid movements following muscle operations are usually transitory. Perhaps the time for their disappearance in this case has not yet come. Such an explanation, however, would not account for the loss of vision in the left eye.

Dr. Smith and Dr. Willetts believed the nystagmus to be purely central and to have no relation to the muscle condition.

Unilateral Exophthalmus with Optic Neuritis.

Dr. S. A. Sturm exhibited the case of L. D., male, aged 62. First seen on Nov. 20th, 1922. Stated that eight days previously vision in right eye began to fail, and has been gradually getting worse. Has had slight pain in the eye. Has always enjoyed good health.

Ophthalmoscopic examination showed disc elevated about one diopter and marked edema of the retina in places, with retinal hemorrhage scattered over the fundus. Vision reduced to form

perception. Tension normal. Left eye was negative and had normal vision. Blood Wassermann 4 plus. Urine normal. Blood pressure normal. Two intravenous injections of salvarsan were given. Today, fundus picture is about the same, but disc is less elevated. Fields are practically obliterated. With exophthalmometer, right eye is about 2 mm. more prominent than the left.

Discussion.—Dr. Stahlman did not think the condition luetic because it is monocular.

Dr. McCorray thought a more complete study necessary, before the etiology and diagnosis could be established. He suggested X-ray examination of the head and a fuller report on the blood chemistry.

Dr. Meanor thought that hot baths, mercury and iodids would be more serviceable theraputic measures in this condition than salvarsan.

Dr. Weimer suggested the possibility of a gumma in the orbit.

Dr. Heckel stated that a gumma in that region would be rare and thought the cause of the condition to be an obstruction at the apex of the orbit more dense and resistant than a gumma would be.

Calcareous Degeneration of Cornea.

Dr. Adolph Krebs exhibited the case of G. T., a girl of 12, a pupil at the Western Pennsylvania School for the Blind, first seen April, 1910. Her eyes had become sore seven days after birth; there had been much pus. Was treated by family physician until ulcers formed and then by a specialist. The eyes recovered from the inflammation in about three months. The right eye was blind and shrunken, but quiet and free from discomfort. The left eye was normal in size and had light and a certain amount of form perception. The cornea was opaque, normal in size, but staphylomatous, except for a peripheral rim two millimeters wide. The eye often became sore (bloodshot) and painful.

She was next seen six years later, when the condition of the right eye was unchanged. The left cornea was more staphylomatous, and a calcareous shell, about five millimeters in diameter covered its apex. There was much pain and lacrimation. Sight was now only light perception in the temporal fields. The shell was removed, leaving a denuded surface that healed within a few days (Specimen exhibited). Several small calcareous particles have formed from time to time since, and the eye has had rather frequent attacks of pain and inflammation.

As the eye no longer had any light perception, and as its presence causes enough discomfort to prevent patient from following some useful occupation, the question of enucleation has been considered.

In discussion, the consensus of opinion was in favor of enucleation.

George H. Shuman, M.D.,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

Clinical Meeting of December 11, 1922, at the Cook County Hospital.

Dr. Francis E. Lane, President.

Medical Ophthalmoscopy.

Dr. George F. Suker exhibited a series of over forty cases which showed pathology of the retina, choroid and nervehead. This presentation gave evidence of the possibilities open for intensive study of the ocular complications of primarily medical cases, if systematically taken advantage of in a large general hospital.

Adenoma of Hypophysis.

Dr. B. W. Lowry reported a case of hypophyseal adenoma in a negro, and exhibited the brain. The patient was a male, 29 years old, first seen October 14, 1922. He complained of blurred vision in the left eye, double vision, headaches and nocturia of about ten months duration. The blurred vision was the first symptom noticed. Vertigo sometimes accompanied the headache. The latter at these times increased in severity. The patient stated that he had a ravenous appetite and had gained thirty or forty pounds in the last three years. Nocturia had recently become a definite

complaint, the patient getting up three or four times every night.

The patient was extremely well developed and well nourished, unusually intelligent and apparently not acutely ill. His temperature was 98° F., pulse 64, respiration 20. The blood pressure was 120-80, pulse pressure 40. General physical and neurologic examination was essentially negative. There were no abnormalities of the genitalia, no change in distribution of hair, no paralyses, no abnormal reflexes and no atrophies.

Right vision was 20/200; left 10/200. Fundus examination at the time of entrance was entirely negative. A perimetric chart was made and a typical bitemporal hemianopsia was found, with no scotomata in the remaining visual fields. A positive Wernicke pupil reaction was demonstrated. No exophthalmos was present. The sugar tolerance on a fasting stomach was found to be between 300 and 400 gms. The functional tests on the ear were essentially negative for localization. The blood and spinal fluid Wassermann reaction was negative. X-ray examination of the sella turcica was negative.

The headaches became almost unbearable despite massive doses of potassium iodid. There was vomiting of the projectile type. A slight edema on the nasal halves of both discs was first noted November 3rd. The patient became unusually confused and stupid. The pulse rate varied from 60 to 80; the temperature was persistently subnormal.

A right sided subtemporal decompression was performed on November 11th. Marked increase in intracranial pressure was demonstrated. The compression symptoms were somewhat relieved following operation, but the patient became gradually comatose and died on November 24th.

Postmortem examination was limited to the head. On opening the calvarium a large quantity of cerebrospinal fluid escaped. The brain was under marked tension, the convolutions being definitely flattened. The sella turcica was unusually large, measuring about 5 cm. in depth by 3 cm. in width, and the rim and clinoid processes were entirely destroyed. Occupying the region of the hypophysis was a large, soft, hemorrhagic tumor mass, about 6 cm. long by 3 cm. broad. Microscopically, this was found to be a typical hypophyseal adenoma, containing chiefly basophilic cells of anterior lobe origin, thin, poorly developed blood spaces and considerable hemorrhage, both old and recent.

The case was considered of unusual interest because it presented hypophyseal tumor with marked neighborhood manifestations and inconspicuous glandular symptoms. There was a typical bitemporal hemianopsia with macular involvement, indicating a lesion of the posterior chiasm; marked diminution of visual acuity; a perfectly normal nervehead, with only very late development of papilledema, and a positive Wernicke sign, localizing the lesion anterior to the primary optic ganglia. The usual early disc pallor was not demonstrated in this case. The symptoms of disturbed gland function were: A persistently subnormal temperature; normal blood pressure which, considering the degree of increased intracranial pressure, might be considered low; a marked increase in body weight; a very high sugar tolerance and polyuria.

Discussion. — Dr. Julius Grinker said the case showed a typical hypophyseal tumor with the clinical symptoms. One negative symptom was the absence of atrophy of the optic nerve; the fundus was reported to have been perfectly normal in appearance, and vision was not markedly affected for bitemporal hemianopsia. This reminded him of a case of acromegaly which he studied for a good many years. He presented the brain at a meeting of the Chicago Neurological Society, and found a condition which explained the appearance of a normal fundus and the absence of the restricted field of vision. The hypophyseal tumors were capable of gradually expanding the chiasm, in such a way that almost a spider web was left; and as long as anything was left of the chiasm the vision might remain normal, and the appearance of the disc show nothing unusual. He thought

this might explain the pupillary findings in the present case. In his own case he preserved the chiasm and it looked like a very fine network. He thought this was the only explanation of Dr. Lowry's case and asked him if he saw the chiasm postmortem.

DR. LOWRY replied that there was so much hemorrhage around the tumor that it was impossible to see the chiasm.

DR. GRINKER thought the case was very classical, except for this, and he inquired whether there were symptoms of acromegaly or abnormal growth of any kind. Hypophyseal tumors of any duration gave symptoms of this disease.

DR. GEORGE F. SUKER said the patient was studied carefully while he was in the ward, and they concluded to do a decompression to save what vision there was. The effect of the decompression was good, but the tumor was inoperable. The size of the tumor should have given better pictures of the sella turcica upon X-ray examination. They made a diagnosis of pituitary tumor, but the X-ray gave no evidence that would warrant anything but a subtemporal decompression. He believed that the conception of what was an enlarged sella turcica was as yet an open question. The patient might move slightly and change the picture because of the foreshortening, and he believed this was what had happened in this case. The brain upon exposure was under marked pressure; but he did not advise anything except splitting the dura and fenestrating the pia and arachnoid, to prevent excessive hernia. This operation relieved the pressure headache, and the papilledema disappeared within seventy-two hours. This latter was quite marked on each nasal side of the discs, and was the deciding factor in advising a subtemporal decompression.

DR. MICHAEL GOLDENBURG said he had noticed on several occasions, that altho the sella turcica was not enlarged, reference was made to erosion of the posterior clinoid processes. In reference to the skiagraphs, he had three cases in one family of primary atrophy, where the X-ray examination showed a bony wall extending from the anterior clinoid process to the posterior. Stereoplates disclosed that the sella turcica was entirely normal. He asked if there was any erosion of the clinoid processes in the present case.

DR. M. H. COTTLE said they had examined the patient twice in the ear department and found a marked diminution of inward past pointing; this Bárány and his followers considered as almost diagnostic of abscess of the frontal one-half of the cerebrum. The inward past pointing consisted of having the right arm past point out, but the left arm would not past point in; and if nystagmus was produced in the opposite direction the left arm would not past point inward as much as the right arm would past point outward.

DR. GRINKER said that the neurologists, who depended so much upon the X-ray for the diagnosis of hypophyseal tumor, took a great deal of stock in the erosion of the clinoid processes as indicative of disease, and giving indications of tumor. He considered this finding almost as valuable as enlargement.

DR. WILLIAM H. WILDER was impressed with the acuteness of the case, and thought this might account for the absence of any symptoms of acromegaly. Had the progress of the disease been slower, they might have developed. He had noticed in two or three cases of hypophyseal tumor, that before any characteristic contraction of the field of vision appeared on the temporal side, some involvement of the fibers of the macular region, causing impairment of the central color sense was found. There was a scotoma for red and green, much as in a neuritis of toxic origin. Later there gradually developed the characteristic contraction of the temporal fields, giving the typical bitemporal hemianopsia. While there was no reason for this to occur frequently, one could conceive of pressure in certain points of the chiasm that would give this phenomenon.

DR. LOWRY, in closing, agreed that the case was very unusual, and that there were very few signs of actual disturbance. The sugar tolerance was

raised slightly; but there was no dryness of the skin or other symptoms to make them think of the hypophysis. The papilledema developed just before death.

Fibrosarcoma of Orbit.

DR. E. B. FINK presented a case of fibrosarcoma of the orbit. The patient was a white boy, aged 7 years, who was first seen on November 7, 1922, complaining of a rather rapidly growing tumor mass above and behind the right eye. The mother stated that this mass was first noticed several months before, and there had been two previous attempts to remove it by operative procedure. Examination revealed a small, rounded, slightly, movable and nonfluctuating tumor mass, at the upper, inner rim of the right orbit. The eye was proptosed considerably and there was a definite limitation of upward and inward movement. Vision in this eye was 20/35. Fundus examination was negative. Skiagrams of the orbit revealed no additional or subtraction bony shadows, and the paranasal sinuses were clear.

The child was operated under general anesthesia on November 13, 1922, and a solid, circumscribed, retrobulbar tumor (1 by 2 in.) was removed. It did not involve the periosteum and the bony surfaces of the orbit were smooth. Microscopic examination revealed a tumor composed chiefly of connective tissue, containing at one corner a considerable number of large oval cells with deeply staining nuclei, and many mitotic figures characteristic of fibrosarcoma. The incision was in the supraorbital line, extending down the bridge of the nose, and the tissues were deflected down to the bone. The tumor mass was dissected out, completely exposing the periosteum and bone. It was entirely outside of the optic nerve, only causing pressure on the eyeball because of its size.

The interesting feature of the case was the age of the patient, the nature of the primary tumor, and the excellent prognosis regarding metastases and the tendency to local recurrence. These fibrosarcomata were locally malignant and often appeared in very young individuals.

Retrobulbar Neuritis Following Salvarsan.

DR. ROBERTSON presented a case of retrobulbar neuritis following intravenous injection of salvarsan. The patient was a white male, aged 39 years, a laborer, who entered the Cook County Hospital complaining of poor vision. He stated that ten months previously he had received treatment for syphilis, receiving six intravenous injections of neosalvarsan in a period of two weeks. Three weeks later, he noticed for the first time a haziness and dimness of visual acuity. He was not a heavy smoker and drank alcoholic beverages only at infrequent intervals.

Examination revealed R. V. 8/200; L. V. 20/65. This vision was not improved by glasses. The fundus was negative, except for a slight pallor of the nerveheads. Perimetric fields were taken, and a bilateral central scotoma was demonstrated for both red and green. A diagnosis of chronic retrobulbar neuritis, with early descending optic atrophy, was made; and the patient was put upon daily injections of 1/4 gr. pilocarpin and active purgation. On November 27, R. V. was 10/200; L. V. 20/50.

On December 8, R. V. 20/100; L. V. 20/30. On December 10, R. V. 10/100; L. V. 20/30. Perimeter chart, at presentation, showed a central scotoma for red only. The patient was presented because it was believed to be a case of chronic retrobulbar neuritis, following intravenous injections of neosalvarsan, and because of the rather marked improvement in visual acuity following a three weeks course of active sweating and purgation.

Discussion.—DR. GEORGE F. SUKER said this case appeared shortly after a notice was sent out by the U. S. Government regarding certain lots of neosalvarsan. This patient had an intensive course of treatment, possibly with the decomposed arsphenamin, which was very toxic when old, and the arsenic content was very strong.

This recalled four or five cases he saw during the war, while stationed at Camp Custer, with a typical arsenical poisoning of the lateral ventricles

and the pons. They gave the symptoms of hemiplegia. One of the patients was brought into the hospital after he had fallen off the door step of the barracks, and a decompression was done for a supposed cranial fracture and dural hemorrhage. Postmortem examination of the brain showed a typical picture of arsenical poisoning. Shortly afterward he had three other cases, following intensive courses of neosalvarsan, and these also gave the same postmortem picture of the brain as the first one.

He believed the man presented had received treatment with decomposed neoarsphenamin, and that the retrobulbar neuritis was the result of that medication. The government had cautioned against the use of this drug.

Dr. Julius Grinker stated that he had used neosalvarsan for many years and also the old salvarsan, but during his entire experience he had not seen a case of arsenical neuritis produced by either of these preparations. One or two cases were supposed to have been caused by the use of these drugs, but careful investigation showed that they were cases of beginning neuritis from syphilis rather than from the treatment. He had had one case, when he was attending physician at the County Hospital, in which the retrobulbar neuritis and descending atrophy were supposed to be due to the treatment, but even that one was doubtful. On the other hand, it had been his experience in these cases that the intensive use of neosalvarsan had reduced the progress of the disease, because the atrophy did not proceed rapidly enough to be called progressive.

In his opinion the hue and cry against neosalvarsan was due to those who had used improperly prepared solutions. He saw one patient who developed a hemorrhagic encephalitis and died following the use of old salvarsan, and such reports were not uncommon in the literature. He believed that neosalvarsan was much less toxic than the older preparation and much more convenient to handle.

He was convinced that the patient under discussion had an ordinary cerebrospinal syphilis, and that the trouble was not due to the neoarsphenamin.

Dr. Robertson, in closing, said the diagnosis was made chiefly on the history, the absence of definite fundus findings sufficient to account for the loss of visual acuity, and the response to eliminative treatment. Whether neosarsphenamin could be sufficiently toxic to cause a retrobulbar neuritis he thought questionable, but the case was quite a coincidence, if nothing more.

Robert Von der Heydt,
Corresponding Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

December 16, 1922.

Dr. G. F. Libby presiding.

Oculists' Names in Commercial Directories.

A resolution was passed to the effect that members of the Colorado Ophthalmological Society should not consent to allow their names to be included in the Red Book published by the Professional Press, Inc., or in other directories which are not under the full control of recognized medical organizations.

Ocular Lesions From Crush of Head.

G. L. Strader, Cheyenne, Wyoming, presented a man, aged fifty-one years, who, on June 15, 1922, had been subjected to a crushing injury from a section of oil well pipe which had rolled over his head. There had been hemorrhage from the ears, nose, and mouth. The muscles of the face had been paralyzed. The eyes had been bandaged for several months. The patient now counted fingers at ten feet with either eye. A dense leucoma involved the lower two-fifths of each cornea. There was partial paralysis of the orbicularis muscles. In the right eye there was almost complete posterior synechia, with a possible lens opacity. In the left eye there was also an extensive posterior synechia, but the upper margin of the pupil was free. Both corneas were anesthetic. Was any advantage to be obtained from an iridectomy?

Discussion.—Melville Black, Denver, would be in favor of letting the

case go on for three or four months more, before deciding to do anything; because the probability of postoperative infection would be considerably enhanced at the present time. In the presence of traumatic lagophthalmia the eyelids can not be closed under a bandage, but the lids must either be stitched together, or closed with adhesive plaster.

EDWARD JACKSON, Denver, agreed with Dr. Black that in the course of another year, or perhaps two, the man's eyes would improve and get into better condition for operation. It would be better to encourage him to hope for a good result if he would wait. In the course of further improvement, there was likely to be some partial clearing of the cornea, which would point the location for an optical iridectomy, if that proved desirable.

Incised Wound Thru Ciliary Body. Question of Enucleation.

W. F. MATSON, Denver, presented a young man, who, on November 17, had been using a large knife to cut a hole in an automobile curtain cover, when the knife was twisted out of his hand and the point of the blade struck him in the right eye. He was looking upward at the time. The point penetrated the cornea, iris, lens, ciliary body and vitreous. The cut in the cornea extended from about one to five o'clock, and onward 10 mm. into the sclera, and divided the lower lid. The sclera was sutured with silk and the lid closed with horse hair. Before closing the sclera all lens substance was cleaned out. The question arose whether it was safe to retain the eyeball. Improvement so far had been rapid, and the eye was already fairly quiet and entirely comfortable.

Discussion.—C. E. WALKER, Denver. If the ciliary body has been cut asunder, either the case will have to be kept under observation right along, or the eye should be removed.

W. H. CRISP, Denver, said that if it was decided to keep the eye under observation, care should be taken to investigate any possible point of focal infection; as in cases of traumatism, persistent irritation was frequently due to such disturbing factors in other parts of the system.

MELVILLE BLACK, Denver. There is complete absence of any critical symptoms which render removal of the eye urgently necessary. If the patient will stay under observation, it will be proper to attempt to save this eye.

Trachoma in Negress. Cystoid Swelling of Upper Eyelid.

W. C. and W. M. BANE, Denver, presented a negress, aged thirty-nine years, who had been under treatment since July 25 for severe trachoma involving only the left eye. The vision of the affected eye was said to have been failing since girlhood, and was now limited to moving objects. The upper lid had been very much swollen since January, and for several months there had been a profuse discharge. There were chronic trachomatous changes in the left eyelids, with massive granulations and reduplications of greatly thickened folds, extending into the angles and up into the fornices. The cornea was very hazy. The day after the patient appeared, the granulations were rolled with Knapp's roller forceps. Within three days there was marked improvement in the amount of edema and of general disturbance; and copper sulphat ointment was ordered. On August 18, 1922, the vision of the affected eye had risen to 5/15 plus. On October 25, bands of adhesion across the conjunctiva of the upper eyelid were divided. On November 17, there were present two large soft movable swellings above and external to the upper tarsus.

Discussion.—J. A. MCCAW, Denver, suggested that the masses were due to obstruction in the ducts of the accessory lacrimal glands. They would thus be really retention cysts, and it would be interesting to puncture them with a hollow needle to see whether they contained tears.

MELVILLE BLACK, Denver. Altho similar to trachoma, the case is probably not one of trachoma; and it is very likely a tuberculosis of the lacrimal gland. It would be worth while to try the effect of a good sized dose of tuberculin for diagnostic purposes.

G. L. STRADER, Cheyenne, Wyoming. The surface of the cornea appears to me to be too smooth for trachoma. It lacks the facets which one usually finds in a case so advanced as this.

W. A. SEDWICK, Denver, suggested that a luetic etiology should not be overlooked.

Iris Tumor.

JAMES M. SHIELDS, Denver, presented a woman, aged forty-six years, who had come on account of a tumor of the right iris. A baby sister of the patient had died at the age of two and a half years from a large malignant tumor occupying the left auricular region, and the patient's mother and father each gave a history of tumors of uncertain character in the region of the face. The patient had what appeared to be a lipoma on the extensor surface of the right forearm. Twenty-two years previously, she had noticed a small whitish mass near the corneal limbus, at the outer margin of the right iris. The mass was said to have grown very slowly until five years before the date of report, when the tumor was supposed to have been operated upon by an ophthalmic surgeon, who had stated, however, that he had "left the shell" of the tumor. Since that time growth had been more rapid, especially in the last two years. At the time of report, the mass extended from the temporal margin of the iris into the pupil, apparently attaching itself at one small point to the anterior capsule of the lens. It now measured 5 mm. laterally and 5 mm. vertically, and projected 2 mm. forward from the surface of the iris. The outer half was deeply pigmented, while the inner half was lighter in color. In general the shape was rounded. The eye was quiet, the uninvolved portion of the iris reacted to light, and the vision was normal with a plus 1.50 sphere. Nothing abnormal was visible in the eyeground. Should the tumor be removed, having a pathologist examine a section at the time of operation? Should radium be tried before attempting operation? Or should the eye be enucleated?

Discussion.—D. H. COOVER, Denver. The case is unusual in the fact that the mass is so darkly pigmented at the outer border and so much lighter in the pupillary portion. It looks a good deal like a melanotic sarcoma, althc the history seems to be against this, it has been so slow in developing. I would do an iridectomy and bring the whole mass out.

W. A. SEDWICK, Denver. Is this a congenital pigmentation that has only recently started growing?

MELVILLE BLACK, Denver, doubted whether any operative procedure short of enucleation was desirable, because of the danger of metastasis.

C. E. SIDWELL, suggested that the growth might be an angioma of the iris.

C. E. WALKER, Denver. This may be a tumor growth which was not at first malignant, but which has taken on a malignant character. If this continues to grow the quicker it is removed the better.

W. H. CRISP, Denver. I thought at first that this might be a cyst deep in the iris structure. But the mass gives the impression of being hard when one makes pressure on the eyeball thru the edge of the lower eyelid.

EDWARD JACKSON, Denver, recalled a case seen many years previously in Philadelphia, first with Zimmerman and later seen by Harlan, in which a growth starting back of the iris came into the pupil. A similar condition existed in each eye, and the final conclusion was that the growth was cystic. However, the history of a spot observed many years ago in Dr. Shields' patient did not exclude sarcoma. Sarcoma often develops very slowly inside the eyeball. In the iris a sarcoma often begins as a pigmented angioma or nevus, retaining this character for half a lifetime and then taking on rapid growth. The mass seems to blend with the cornea at the limbus, and it is doubtful whether removal of the tumor without the eye would be sufficient. It should be put up to the patient whether she will take the responsibility of retaining the eye. He believed it would be perfectly proper to try radium in this case with careful screening.

E. R. NEEPER, Colorado Springs. If it is found that there is a posterior

synechia, an attempt at removal of the growth would be likely to be followed by cataract formation. In that event I would not consider anything else but enucleation.

Optic Atrophy After Fall on Broomstick.

JAMES M. SHIELDS, Denver, presented a boy, aged twelve years, who, on October 31, 1922, had fallen upon a broom handle, striking the left eye. A week after the accident the parents had consulted Dr. Monaghan, and they had later seen Dr. Franklin. The vision of the eye had been lost, and the eyeball now turned upward and outward. The pupil of this eye was not so large as that of the other eye. There was a symblepharon extending from a rather long, almost horizontal conjunctival scar, below and a little to the nasal side of the center of the cornea, to the upper edge of the caruncle. The blindness of this eye was absolute, and the nerve head was apparently atrophic. X-ray study did not show a fracture of the optic foramen, but it seemed likely that such a fracture had occurred.

Discussion.—D. G. MONAGHAN, Denver, said that the condition was now very much as it had been two weeks after the accident. The boy was able to move the eye downward a little better than he had been when Dr. Monaghan saw him.

EDWARD JACKSON, Denver, thought that the optic atrophy was likely due to a hemorrhage into the orbit.

H. R. STILWILL, Denver, referred to a small boy, seen a year or so ago, who had had a partial optic atrophy after a fall from his bicycle on the side of the head.

MELVILLE BLACK, Denver, suggested that the force of the blow in Dr. Shields' case might have rotated the eyeball in such a way as to tear loose the inferior rectus muscle.

Ulcerative Destruction of Lids and Eyeball.

J. A. MCCAW, Denver, presented a Mexican laborer, aged twenty years, who stated that his trouble had begun in 1917 with a furuncle like swelling in the region of the inner canthus of the right eye. The inflammation had extended to both eyelids, causing necrosis of the tarsal plate, of the canthal ligaments of both eyelids, and of the skin of the lids. In 1918 the eyeball became involved, the cornea was ulcerated, and an anterior staphyloma developed, involving almost the whole cornea. The vision was completely lost. Subsequently the cornea ruptured and the iris and lens were pushed forward. The eyeball had been enucleated, and the whole operative field had since been covered with a thin purulent secretion. In 1919 the bridge of the nose had become involved in the process, a saddle nose resulting. The vision of the left eye was normal. A positive Wassermann test had been obtained. The case was presented for discussion of the differential diagnosis between epithelioma, rodent ulcer, and syphilis.

Discussion.—MELVILLE BLACK, Denver, suggested that a gumma might have broken down and destroyed the eyelids as had happened in this case.

EDWARD JACKSON, Denver. One thing about the lids is very peculiar, that is the perfectly regular line which separates the thicker tissue below, from the broad strip of thinner tissue toward the margin. It evidently marks the boundary of scar tissue which has been left by an ulcer. I wonder whether the original lesion could have been a primary sore, with a secondary involvement breaking down the eyeball.

W. F. MATSON, Denver, recalled a case seen about ten years previously in a nurse. An ulcerated growth on the lower eyelid proved to be a gumma, and healed under specific treatment in about six months.

W. A. SEDWICK, Denver, referred to the case of a Christian Science woman, who had come to him with the eyelids and the eye and part of the nose destroyed. The condition had healed under antisyphilitic treatment.

Advanced Chorioretinal Atrophy.

J. A. MCCAW, Denver, presented a man, aged thirty-six years, who, ten years previously, had been discovered by the railroad surgeon to have lost the vision of the left eye. The patient stated that he had first noticed failure of vision of the right eye about six

months before the date of report. The vision of the right eye when he came for examination was 2/60. The left eye was completely blind. A Wassermann test was plus four. Ophthalmoscopic examination of the left fundus showed a pale disc and atrophy of the nutrient vessels. The retinal vessels, both arteries and veins, were very much reduced in caliber. Below the disc there was extensive atrophy of the retina and choroid, the choroidal vessels being sharply defined. There were several areas in which the choroidal pigment was heaped up in a circular arrangement around a patch of complete atrophy of the retina and choroid. There were similar changes in the right fundus, but in an earlier stage the bloodvessels being narrower than normal, and pigment changes marked. An interesting point about the case was the apparent interval of ten years between the loss of vision of the left eye and the patient's observation of the disturbance of vision in the right eye.

Discussion.—MELVILLE BLACK, Denver. The fact that the patient has a four plus Wassermann does not necessarily prove the case is specific. It looks to me rather tuberculous than syphilitic.

W. H. CRISP, Denver, thought that the case was one of advanced syphilitic sclerosis of the retina and choroid.

EDWARD JACKSON, Denver, said that the whole pigment layer was gone, and that looked like syphilis.

WM. H. CRISP,
Secretary.

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

DR. M. M. CULLOM, President.

December 18, 1922.

Bilateral Cataract Extraction.

DR. HERSCHEL EZELL presented the following case: Mrs. J. T. H., aet. 53, first consulted him November 8, 1921, complaining of blindness in each eye, the right eye having been totally blind for about three years, and the left eye for only a few months.

Right eye: Vision = P. L. Cornea clear; projection, pupillary reaction and perception of light, good. Tension normal. Diagnosis: Mature senile cataract. Left eye: Vision = P. L., and movable objects at close range. Cornea clear; projection and pupillary reaction good. Tension normal. General physical condition good. Urinalysis negative. Advised extraction of cataract from right eye and operation on left eye later.

Nov. 9, 1921. Combined capsulotomy extraction under local anesthesia. Operation successful and patient left hospital on seventh day.

December 12, 1921. R. Eye: + 10.00 D. S. ⌒ + 1.50 D. C. Ax. 10, V. = 20/20. Patient dismissed to return later for operation on left eye.

October 23, 1922. Patient returned ready to go to hospital. Left eye practically blind since a few weeks after right eye was operated upon. Vision = P. L. Projection and pupillary reaction good. Urinalysis negative. Patient sent to hospital to be prepared for operation.

October 24, 1922. Combined cataract extraction under local anesthesia. Operation successful and patient sent home on seventh day.

Nov. 28, 1922. R. E. + 10.00 ⌒ + 1.50 C. Ax. 10. V = 20/50. L. E. + 9.50 ⌒ + 0.50 C. Ax. 0, V. = 20/20. Right eye shows thin remains of capsule, with secondary cataract. Left eye: Fundus seen clearly; no remains of capsule.

Question: How is the 20/20 vision in the right eye on December 12, 1921, accounted for, since patient has only 20/50 vision with faint capsular cataract at this time?

Discussion.—DR. HILLIARD WOOD was not surprised at the failure of vision in the right eye after several months, such failure being apparently due to the development of capsular opacity. He has often noticed that following extracapsular extraction the vision is relatively low from capsular opacity, and when that opacity is disposed of, the vision improves very materially. It is remarkable how much these capsular opacities will reduce the vision below normal, but, in his opinion, all that it has been reduced by such an opacity can be restored by any

suitable operation for secondary cataract.

DR. EZELL inquired as to the advisability of an attempt to divide or remove this capsular opacity.

DR. E. B. CAYCE believes that with 20/20 vision in one eye, and potentially 20/20 vision in the other eye, the patient would be more comfortable as she is, than she would be with the same vision in each eye, owing to the fact that she cannot have binocular close vision. He fails to see how one can regard needling as a minor operation. His advice would be to let the right eye alone.

Thrombosis of Central Retinal Vein.

DR. HILLIARD WOOD exhibited the case of Mr. O. V. B., elsewhere reported in this JOURNAL. See p. 400.

Discussion.—DR. E. B. CAYCE said that with the condition presented by this patient, he would not hesitate, upon the least suggestion of trouble, to clear the ethmoids and examine the sphenoids.

DR. M. M. CULLOM spoke of the possibility of there being some obstruction which might account for this condition. He pointed out that thrombosis of the central vein is usually unilateral and generally unaccompanied by any sign of disturbance in the other eye, and while this condition to him does not look entirely like a thrombosis of the central vein, yet the profusion of hemorrhages and the fact that it is unilateral, would bring up the possibility of there being some obstruction to the return flow of the blood.

Ocular Complications of Sinuitis.

DR. E. B. CAYCE presented the case of Mrs. E. L. W., aet. 38, with the following history: Three years ago patient had a severe pain over the left eye which was relieved entirely by removing anterior end of middle turbinate and enlarging the ostium to the frontal sinus.

In July, 1922, while in Aberdeen, South Dakota, she developed a severe pain in left eye with the eye assuming the appearance of cellulitis of the orbit. At that time Dr. R. D. Alway of the Aberdeen Clinic had charge of her and reported his findings as follows:

"Mrs. W. called on me July 7, 1922, suffering from an acute infection in the left eye. Ophthalmoscope revealed an acute papillitis, vision counting fingers, tension 40 mm. Hg. She was suffering a great deal of pain, and had suffered a great deal of pain in the eye for several days.

"The patient was hospitalized and dionin and eserin prescribed locally. On the second day transillumination of the sinuses revealed a slight cloudiness in the left antrum, other sinuses clear. Patient gave history of having had an intranasal frontal sinuitis two years previous.

Under cocain, frontal and ethmoids were irrigated and antrums drained and irrigated thru the nose. Leucocytosis at this time showed 16,000. There was some relief following this for a couple of days, when pain increased. During this time the infection and swelling of the eye had increased. X-ray was taken, which showed frontal and ethmoids perfectly clear; left antrum blurred. Under local anesthesia the antrum was opened and the canine fossa was irrigated. At no time had any fluid or pus been found in the antrum, following irrigation. Also aspirated below and above the eye into the orbit for pus. Leucocytosis had increased to 19,000. Papillitis had increased and vision nil. Tension had changed from 40 to 60 mm. Hg."

Patient decided to return home, and in passing thru Chicago, saw Dr. Herman P. Davidson, who very kindly sent me his findings. When I saw her the eye was proptosed about 3 mms., iris discolored, tension 38 mms. and vision nil. The right eye was normal July 25, 1922. An injection of cyanid of mercury subconjunctivally, with atropin and dionin instillations relieved pain, and there was some improvement in vision.

Dr. Hilliard Wood was called in consultation, and made a diagnosis of well developed neuroretinitis, with paresis of left third nerve, and low grade of septic orbital cellulitis, left eye. Physical examination, including a Wassermann, was negative.

As she was apparently improving, we decided to wait. Soon after this, I left on my vacation, and she was in charge of Dr. J. L. Bryan. After my return in September, I found she had a recurrence of her eye discomfort, for which morphia was required to relieve the pain. She was returned to St. Thomas Hospital, and Dr. J. L. Bryan, Dr. Hilliard Wood and Dr. F. E. Hasty saw her in consultation with me. After two weeks she began having a similar swelling of the right eye, and after consultation it was decided best to exenterate the ethmoids and drain the sphenoid, which was done. The improvement was very marked, and almost immediate in the right eye, but the condition of the left eye remained very much the same. The pain in the left eye persisted and it required large doses of morphia to relieve her. Some ten days later, the iridocyclitis had cleared up and it was possible to see the fundus in the left eye, which showed a beginning atrophy. There were some hemorrhagic spots in the right eye also. As she was improving, I advised waiting, but if the pain recurred to do an external frontal operation. One week later, there was a recurrence of the pain, and the proptosis increased, so intranasally, I opened the orbit and there was an exudate of serosanguinous fluid. The position of the eye was very much improved, and it became a question of taking her off the morphia, which was done in ten days by gradually reducing the amount. She is now free of pain, vision in right eye is 5/10 and in the left eye fingers at 12 inches. Right eye shows choroidal spots in the region of macula, immediately below. Left eye shows atrophic nerve head.

This is a case which shows the footprints of an ethmoiditis, with a low grade infection in the orbit.

MEMPHIS SOCIETY OF OPTHALMOLOGY AND OTO-LARYNGOLOGY.

December 12, 1922.

Sequels of Iritis.

Dr. E. C. Ellett showed Mr. T., aged 30. Has had several attacks of iritis in the last ten years, without apparent cause. History of "rheumatism," but no foci of infection and negative blood and spinal fluid. Last attack of iritis in R. Oct. 3rd, L. Oct. 24th. On November 23rd the inflammation had subsided, but the pupil in R. was adherent all around, and filled with a filmy membrane. Iris bombé more marked above. Vision 20/200, tension R. 28, L. 17.

November 28th. iridotomy, after the method of Curran. The iris flattened, the tension fell to normal and the vision rose to 20/20.

Discussion.—Dr. Hughes inquired into the tonsil condition of this patient. Dr. Ellett reported negative findings of this patient's tonsils.

Sequels of Vitreal Hemorrhages.

Dr. E. C. Ellett showed the patient.

Miss P. aged 21. Failure of vision, R. August 5th. Eye previously normal. Vision 2/200. There were retinal and vitreous hemorrhages in the lower half of the eye, the source of which could not be seen. General physical examination negative, except some bad teeth which were removed. The hemorrhages in the vitreous have been replaced by white masses, without vascularity, doubtless organized hemorrhages. The opinion that the trouble was tubercular was agreed to by two New York consultants. No tuberculin test was made, as her physician and two of the three oculists thought it unsafe. There are vitreous opacities, some hemorrhages near the disc, and the organized masses below, but the vision is now 20/20.

Discussion by Drs. Lewis, Blue and Stanford.

Cicatricial Ectropion.

Dr. E. C. Ellett showed the patient. Paul P. aged 10. Exhibited marked cicatricial ectropion of both lids of the right eye following a burn. One week ago the upper lid was turned down after an incision around the lashes, and sewed to the cheek. The line of lashes lay above the level of the other eyebrow. The raw surface was covered with a single large Thiersch graft taken from the thigh. The raw surface was about two inches square. The eye was dressed for the first time at the meeting.

Conjunctival Flap for Perforating Wound of Eye.

DR. J. B. STANFORD showed two cases. V. L. G., on October the 6th was running a machine for shaping wheel spokes when something, presumably a splinter of wood, struck his left eye. When seen about one hour later, he had a wound of the cornea at the inferior temporal margin, extending about two or 3 mm. toward the center of the cornea. The iris was prolapsed thru the wound. A conjunctival flap was prepared, the prolapsed iris excised, toilet of the wound as in intraocular operation, and the flap was drawn up over the wound. On October tenth the stitches had pulled out and the flap was slipping off the cornea. The pupillary margin was seen to be intact, and the iridectomy was of the button-hole type. The eye was not entirely clear until one month after this date. At that time the vision was 20/20 without correction. The anterior chamber was normal and there was no synechia.

On January 21st, Mr. R. C. H. was cutting a piece of brass off a rod, when a chip flew into his left eye. When seen about two hours later, he had a horizontal wound extending from near the inner canthus into the cornea for about four mm. The wound included all the coats of the globe, and there was a considerable iris prolapse. The flap in this case was brought up from below and the entire extent of the wound was covered. On January 27th the flap had slipped back into place, the wound was closed and the pillars of the coloboma were free. An opacity of the posterior capsule was seen directly under the corneal scar.

On March first the vision in this eye was 20/50, improved to 20/25 by plus 2 S. combined with minus 2.50 C. Ax. 75°. The media were clear except for the opacity noted above, and the fundus was normal. In the latter part of March, he suffered from an acute iritis in this eye, which cleared up in one week. Some vitreous opacities were seen at this time.

He was not seen again till December eleventh, when the vision of the left eye was 20/70, improved to 20/25 plus, by plus 1.50 S. combined with minus 3 C Ax. 75°.

Discussion by Doctors Ellett, Blue and Lewis.

D. H. ANTHONY, Secretary.

BROOKLYN OPHTHALMOLOGICAL SOCIETY.

December 21, 1922.

Sequel of Cataract Extraction.

DR. R. M. ROGERS presented a patient upon whom he had performed a combined extraction. 3 or 4 days after operation, prolapse occurred. Atropin dermatitis of lids and conjunctival irritation delayed operation until 25th day, when he dissected up the conjunctiva from 7 to 3 o'clock at limbus and back far enough to make flap exposing prolapse. Prolapse excised and wound cauterized (actual cautery), and flap sutured over wound. Anterior chamber restored in 24 hours. Sutures removed sixth day and wound healed readily. 6 weeks later vision 20/40.

Magnet Extraction of Foreign Body.

Dr. R. I. Lloyd presented a case in which a piece of steel deep in the globe had not been affected by the Haab magnet, but was readily removed with the Hirschberg magnet by posterior route, eye in good condition.

Experiences in Working with Dr. Barraquer in Barcelona.

DR. WILLIAM MCLEAN, of New York City spoke on this subject.

Discussion.—DR. CLYDE MCDANNALD, of New York City said: "My experience in the extraction of cataract by the vacuum method arose after reading Dr. Barraquer's article which appeared in the American Journal of Ophthalmology, two years ago last October. I studied the method and thought a simpler device might be employed for this operation. I devised an instrument, and after constructing it employed it on several occasions, and then thought I had acquired sufficient experience to warrant my expressing an opinion in regard to operation by this method, and wrote an article, published in the A. J. O., v. 5, p. 90.

"I have been interested in hearing Dr. McLean's statements in regard to

Dr. Barraquer. I saw him operate on seven cases at the N. Y. Eye and Ear Infirmary on his recent visit to America. I felt he was operating at a great disadvantage. He had no means of studying his cases, and I concluded it was unfair to judge him by results these obtained. In the first case there was loss of vitreous and inversion of the upper half of the iris, with poor vision. One case on Dr. Weeks' service had to have the eye enucleated. Some of the effects of this method are too much traction followed by irritation, vitreous opacities, and intraocular hemorrhage. Once a lens was dropped, and in attempting to take it up the vitreous was drained off. Dr. Green in San Francisco is now using it in 95% of cases. His instrument is similar to mine and is operated by a foot valve. It is a slow procedure. My instrument has a large hole over which the finger is slipped and which can readily be released. It does not create a vacuum until it is ready. A No. 50 Sorenson pump is used. A vacuum control gauge is used. The gauge is set at 15 lbs. to obtain sufficient contraction to hold lens. My procedure was the usual preparation for cataract extraction, thoro anesthesia 20 to 25 minutes, followed by subconjunctival injection, iridectomy, either preliminary or at the time of extraction. Section must be larger than the ordinary section. Nearly one-half of the cornea must be used. The instrument was introduced and then moved about by shaking. Traction was too great. The posterior surface of the cornea was damaged by massaging with this instrument. Perhaps this is why Dr. Barraquer turns his lens. Considerable keratitis is produced, which is quite persistent. I finally tried to press the lens out, but was unsuccessful. If I attempt any more it will be by combined suction and counter pressure.

Dr. Clifford Place saw Dr. Barraquer's demonstration at Washington, and was strikingly impressed by the method with which he made his section. Instead of making 6 to 8 sawing strokes he does it in two motions. He would like to ask whether the sutures which Dr. Barraquer inserts are in the way during the operation?

Dr. John Bailey.—In case of rupture of the anterior capsule what does Dr. Barraquer do?

Dr. Henry M. Smith.—Does Dr. Barraquer perform a bridge iridectomy? There is a constant desire to get rid of the capsule because the needling is not so safe an operation as it might seem to be, also because it does away with lens cortex.

Dr. Minsky asked whether the pump registered 65 cm. of Hg., as Dr. McLean had stated, or 65 mm.?

Dr. McLean, closing.—Dr. Barraquer's dexterity in making the incision is due to the kind of knife he uses. The pressure is 65 cm. and is maintained all of the time. It gets to this point in about 2 seconds. The negative pressure is right up to the valve all the time. The state of the lens and pressure needed is determined by examination with the corneal microscope. When lenses have vacuoles in the cataractous material, it renders them less promising for this operation.

Dr. Barraquer by his turning of the instrument avoids getting it against the cornea. He really rolls the lens out of the patellar fossa. This allows air to rush in back of the lens and helps to hold the vitreous back. The iridectomy he performs is the iridectomy of Hess—a tiny peripheral iridectomy right under the angle of the anterior chamber. He uses a special forceps which picks up almost to the root of the iris. He also has a special scissors. If preliminary iridectomy has been done, the reverse procedure is used—the lens is turned upward instead of downward. The sutures are applied after the iridectomy is performed and are just pushed lightly to the side to get them out of the way.

If the lens ruptures as it is being removed, it can frequently be removed by going from behind. If it occurs early before the lens is started discard the erisiphake and proceed in the usual way.

There is very little if any astigmatism following this operation.

The use of Ammonium Chlorid in Lime Injuries of Eye.

Dr. Herbert D. Schenck then read his paper on this subject.

W. M. Gardner,
Secretary.

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GRADUATE TEACHING OF OPHTHALMOLOGY.

The visit of two collaborators of the *American Journal of Ophthalmology*, to great centers of ophthalmic teaching in Europe, gave them opportunities to observe conditions and draw conclusions, that are of interest to our readers. These they have kindly written out, and they are submitted in the following pages.

In continental Europe, the institutions of advanced learning and professional training have been shaped by governmental policies, and rested on governmental support. Political, social and economic changes have profoundly disturbed them. What some of these disturbances are, have been ably set forth in a recent article by Professor Harnack, of Berlin, in the *Nation* and *Athenaeum* of London, reproduced in the *Living Age* of Boston, entitled "The Crisis in Science".

He states that it has become quite impossible for Germans to procure foreign scientific books. "For if we have to pay from 20,000 to 40,000 marks for a medium sized book, or for a yearly subscription to a periodical of some five hundred pages, all possibility of purchase is excluded. The consequence is that we are placed outside the sphere of international scientific activity." "German scientific works can no longer be printed, and German scientific periodicals have to cease publication." "Savants of high repute are experiencing the greatest material difficulties." "The younger generation, by which scientific research must needs be continued in the future, is rapidly diminishing in numbers." Then appealing for support from outside of Germany, Professor Harnack points out: "A civilization in a state of decay, with all its accompanying symptoms of brain fever, moral disease, unrest, and devastation, constitutes a danger not only for its next-door neighbors, but also for the whole world."

The situation is one to command the attention of all the thoughtful English reading ophthalmologists. Apparently the time has come for leadership in ophthalmic science to pass, to some extent, from Germany and German speaking countries. This entails on other medical centers, particularly in America, the heavy responsibility for leadership. In the great cities of the United States and Canada, and a

few of South America, not forgetting Habana and Mexico, the material support for such leadership exists and can be turned to this worthy purpose.

There are universities with the essential departments, that can be developed in a single generation to greatness equal to any reached in Europe. There are groups of ophthalmologists, with their local organizations, who have profited by the best culture that European ophthalmology had to offer. All that is needed is men who are willing to devote their lives chiefly to teaching; and who have the vision and persistence to carry their purpose to fruition. There are indications that in most of these American centers such men are not lacking; and they can be recruited from European teachers, whose search for opportunity turns their eyes toward the New World. E. J.

CLINICAL OPHTHALMOLOGY IN PARIS, ZURICH AND MUNICH.

Upon request, I submit a brief account of some clinical impressions from my recent European trip. At Paris I revisited the large Clinique Nationale Ophtalmologique des Quinze-Vingts, well known to me from my former journeys. I was very glad to be greeted again by Drs. Valude and Kalt. Dr. Valude very skillfully extracted a piece of iron from the interior of the eye. The patient was lying down, and the giant magnet, placed over him, drew the piece into the anterior chamber. Thence it was extracted thru an incision with the lance shaped knife, by the small tip introduced into the anterior chamber and brought in contact with the large magnet. Then he presented a case of spasm of the left facial nerve, and demonstrated the place where the needle had to be inserted to strike the nerve for the injection of pure alcohol. This was done with immediately following paralysis of the facial nerve, which will soon disappear.

Generally the clinics are held from one o'clock until late in the afternoon. Dr. Chaillous, however, devoted a whole morning to his many operations. There are two operating tables, one facing the large window of the spacious operating room with the right, the other with the left side; alternately used for operations on the right and left eyes. Cyanid of mercury is still used as an antiseptic. Lids and ciliary margins are painted with tinctur of iodin and glycerin. For orbital anesthesia, injections are made into the upper and lower lids and along the temporal wall into the depth of the orbit. They produce anesthesia of the ciliary body and guard against blepharospasm. Dr. Chaillous performs cystotomy before iridectomy, so that the vision of the operator is not interfered with by hemorrhage from the iris. A secondary cataract was removed with the forceps of Panas (similar to Mathieu's forceps) and de Wecker's pince-ciseaux. Prolapse of the iris after a cataract extraction was galvanocauterized and covered by a conjunctival flap. This conjunctival covering also was done in a case of sloughing of the cushion after Elliot's trephining on the eighth day. Pterygium was abscised, cauterized, and the conjunctiva sutured. A man, aged 18, had an intracranial metastasis after a spontaneous fracture of the left humerus due, as revealed by microscopic examination, to sarcoma. He had exophthalmus of one eye, and the most typical choked discs of both eyes.

I was sorry not to find Dr. C. Abadie at home, but I was told by his assistant, that at the clinic Abadie's methods of dry sterilization of the instruments and intravenous injections of cyanid of mercury, are still practised with great success.

Professor Sidler-Hugenin, the successor to Professor O. Haab in the directorship of the eye clinic at Zurich, was absent on account of illness; but his assistant showed me around. Professor Haab, who now confines himself to his private clinic, told me at a former visit that ophthalmoscopy is such a beautiful art that it deserves adequate quarters. And indeed, to mention only one feature of the ideally located University eye clinic, the very large room devised by him for oph-

thalmoscopic courses fulfills the highest demands for efficiency and comfort.

In approaching the medical quarters of the University of Munich, the visitor is favorably impressed to see the memories of the great men of medicine and science, who taught there, honorably perpetuated by the city in the naming of the streets, e. g., Frauenhofer, von Pettenkoffer, von Nussbaum, von Ziemssen streets. The eye clinic is an immense building, with spacious rooms and an abundance of light. One is at once aware of the scientific atmosphere imparted to this great institution by its celebrated director, Professor C. von Hess. Thanks to his early training at the physiologic laboratory of Ewald Hering, he has preserved his love for physiology, as attested, aside from his ophthalmologic achievements, by his admirable original investigations on the physiology of the visual organ, which he continues to enrich by valuable, exact contributions.

It was most interesting to see his work rooms, with the many forms of apparatus of his own device. One space is devoted to the examinations with his differential pupilloscope, which allows one to recognize disturbances of the pupillary reaction not only much earlier than previously possible, but also to ascertain numerically the degree of disturbance. Many cases from the neurologic clinic are sent there for diagnostic purposes. At the clinic one saw numerous cases of intracranial war injuries, with various disorders of the visual fields. The binocular corneal microscope with slit lamp illumination is in constant use. An immense lecture hall is provided with all kinds of appurtenances for demonstrations. There is a large room for ophthalmoscopic courses, and in the basement, with plenty of light, are splendid laboratories for anatomic and histologic researches. The teaching facilities are wonderful, and it is only natural that not only a large number of students, but also ophthalmologists from all parts of the world, flock to this great institution. Under the present unfortunate economic conditions, by which the medical profession is hard hit, one cannot but admire the indomitable scientific spirit still prevailing.

After returning to our great country, I was very anxious to see the new Herman Knapp Memorial Eye Hospital at New York. The excellent plaque of Herman Knapp in the lobby of this magnificent structure welcomed one like home, and around were many dear remembrances of the time of our assistantship to this great master. It was most gratifying to see, in the splendid work of his son, the spirit of the illustrious father rejuvenated under the best facilities in modern surroundings.

In concluding this brief report of some of my impressions at the different clinics I visited, I wish to repeat my grateful appreciation of the kindness and fraternal welcome with which I was received by these eminent representatives of ophthalmology.

CHARLES ZIMMERMANN.

COURSES IN VIENNA.

During the period of the recent war, graduate teaching of ophthalmology ceased in Vienna. Following the cessation of hostilities, the economic status of Austria was in such a deplorable condition, that it was only after great effort that teaching was revived.

The American Medical Association of Vienna, which is composed of foreign graduate students who are studying in the city, was brought to life again, after the declaration of peace and with the return of foreign students. Prior to 1914, most of the graduate courses were arranged by the Association, and the courses available were published in the organization's blue book. Incompatibility in the points of view of students and instructors made it difficult for a harmonious understanding between the Association and the various graduate units; and the quality of work suffered from misunderstandings. Conditions, however, have undergone a decided change for the better; and at the present time harmony exists on both sides, with few exceptions.

In ophthalmology, work is available in both eye clinics of the Allgemeines Krankenhaus. The first clinic is headed by Prof. Dimmer, who does very little teaching. Docent Karl Lindner gives courses in bacteriology, external diseases, skiascopy, and other subjects. Dr. Guist, and others of the same clinic, also give courses. Prof. Meller heads the second eye clinic and gives a course in eye operations. Docent Bachstez gives courses in external diseases, muscles, ophthalmoscopy and other subjects. Docent A. Fuchs histology and pathology, and other assistants give courses. Most of the courses are well presented and given in English. The number of students in each class is usually limited to ten. Didactic courses are often given to more than that number. There are opportunities for viewing operations; and under favorable conditions, of attending the clinics of the out patient departments.

In the past, there has never been an attempt to give a systematized course in ophthalmology. The first effort in this direction was made last year in the eight weeks' course which was started in October. The course covered most of the important branches of ophthalmology. The announcement and schedule of the work were published in the July, 1922 number of the A. J. O.

A class of fifteen took the work. Those who had some experience in ophthalmology found the course to be a splendid review, and an opportunity for studying the methods in vogue among the leaders in ophthalmology in Vienna. The opinions of the instructors on various subjects were discussed freely, at various times.

The course in operations, given by Prof. Meller, was a review of his book, with demonstrations upon the cadaver and pigs' eyes. Each student was given opportunity to repeat the operations under Prof. Meller's personal supervision.

Docent Lindner's course in bacteriology was the most original and valuable, from the standpoint of recent advances in our specialty. It was given both didactically and with laboratory demonstrations, in which the student took an active part. The parasitic nature of the pathogenic bacteria of the eye, a theory originally presented by Lindner, was splendidly demonstrated. There was nothing unusual in the course in refraction.

Docent Bachstez is an excellent teacher. His course in ocular muscles was splendid, and his course on external diseases was good. The work in histopathology, which was given by Docent A. Fuchs, was practically a repetition of the lectures and demonstrations which were given by the elder Fuchs in this country.

Ophthalmoscopy was taught in three lantern slide demonstrations of fundus plates; and the remainder of the time, an hour each day, was spent in the dark room examining fundus lesions. The abundance of varied fundus cases made the hour extremely profitable for advanced students. But for the beginner who was unfamiliar with fundus pathology, the course was of little value, excepting to perfect him in the technic of the indirect method of ophthalmoscopy. With the abundance of fundus cases and the opportunities for coordinating the histopathology of the fundus, this was only done superficially, so that the course in ophthalmoscopy fell short of expectations. The red free light was available for use and of interest to advanced students.

The course will be repeated in the future, but will be under the auspices of the American Medical Association of Vienna. Graduate instruction in ophthalmology, as it is given in Vienna at the present time, is poorly arranged for a beginner. Systematized courses dealing with the fundamentals of ophthalmology are now available in several American universities. The beginner who has ambitions for foreign training, will benefit greatly by taking such a course in America before going to Europe. Men with moderate training will find opportunities for profitable study in Vienna, and advanced students will find a number of things of interest.

Before deciding to go abroad, one will do well to look over America; because at the present time, there are

splendid opportunities for graduate study in this country.

WILLIAM C. FINNOFF.

SUBJECTIVE VISUAL SENSATIONS, ILLUSIONS.

Ordinary vision depends on a highly specialized and rapid metabolism. The rapid succession of images perceived by the retina means that the retinal nutrition is such that the photochemic waste is rapidly removed, and the needful materials for new exercise of function as rapidly supplied. Such metabolism is easily disturbed, so that the share which exposure to light plays in the production of images may be varied. Indeed, all the phenomena of dark and light adaptation prove, that the retina can lose and regain, to a very great degree, its sensitiveness to light, and still keep within strictly normal limits.

Probably this active metabolism, highly specialized in various directions is a characteristic of all nerve cells; and with it goes liability to influences other than that of the special stimulus to which the particular nerve cell normally responds. The retina being genetically and structurally a part of the central nervous system, it is extremely difficult to discriminate as to what part of the normal act of vision takes place in the retina, and what part takes place in other nerve structures concerned with vision. But without going into the question of just where the abnormal functional activity is aroused, it is certain that *influences other than light can give rise to visual sensations.*

No one who has slipped on the ice and struck his head, or bumped a door post in the dark, needs to be told that he can get visual sensations independently of light. The mechanical agitation of a blow on the head, or pressure from any source, can cause change of the activity of any part of the nervous system, unconsciousness, confusion of thought, lowered sensation, or excitation apart from the normal stimulus to sensation. Chemical influences do the same thing. The illusions caused by carbon monoxid poisoning, Indian hemp, atropin or alkaloids of opium, are all familiar. The delirium caused by fevers probably rests on a basis of toxemia, and the possible share of the recently recognized focal infections in causing subjective sensations, should be carefully considered.

Any study of subjective symptoms and their etiology and significance, must rest upon the scientific training of the observer. Hence cases of visual disturbance observed by oculists, who are accustomed to consider the visual field and the distribution in it of forms and colors, become especially significant and valuable in this connection. The impressions of three such observers are published in this number of the journal (pages 392, 396 and 432). If enough such reports are brought together, it may appear that while the hypothesis of brief arterial spasm, diminishing for a time the blood supply of the part, fits some cases, others agree better with a general toxic influence; acting directly on the nerve cells concerned in vision, instead of thru those having a vasomotor function. It may become clear that this class of phenomena may depend on changes in different parts of the visual tract—in one case the retina, in another the occipital cortex, etc.

It is greatly to be hoped that such reports may throw light on the etiology and therapeutics of such cases. Very careful observations as to the bodily conditions preceding such attacks, the exact parts of the visual fields involved, the succession of sensations, the influence of inhalation of amyl nitrit or oxygen, should all be closely noted, by those who have the opportunity to make such observations in their own persons. Perhaps most oculists have the opportunity to make such observations one or more times. But in a first attack, the alarm and mental confusion incident to it may prevent any exact observation and valuable record. Notes written down as soon after an attack as possible, will have the greatest value. Those with whom the attacks recur, have the opportunity to study causal or concomitant conditions.

E. J.

BOOK NOTICES.

Ultraviolet Radiation, Its Properties, Production, Measurement and Applications. **M. Luckiesh,** Director of Applied Science, Nela Research Laboratories. 258 pages, 12 plates. New York, D. Van Nostrand Co., 1922.

"It is the primary aim of this book to present authentic data of such scope as to be useful to those who are interested in ultraviolet radiation," is the statement of the author in his preface. In following this aim he has brought together in convenient shape a large amount of information regarding one of the borderlands of ophthalmology. Ultraviolet radiation claims attention, both as a possible cause of ocular disease and as a promising therapeutic agent. Its possibilities seem great; but they are just being explored and redeemed from speculation and quackery. What the ophthalmologist needs is well authenticated facts; and this book helps him to distinguish between fact and speculation.

The book opens with an introduction that is largely historical. It begins with Newton and the visible spectrum (1666), comes to Ritter and the effect of ultraviolet on silver chlorid (1801), Daguerre and photography (1837), Maxwell (1868) and Hertz (1888) working with the longer electric waves, and Roentgen (1895), who greatly extended the knowledge of short wave radiations. It also gives the relative values of the common units of wave lengths, the Angstroem 1, the millimicron 10, and the micron 10,000, the latter being one-thousandth of a millimeter. The introduction also gives a table of the various known radiations, beginning with the gamma rays at 0 and extending to known electric waves that are miles in length. It emphasizes, too, the uncertainty and confusion that spring from the practice of ascribing effects to "ultraviolet rays," without indicating just what part of the ultraviolet spectrum is meant.

Chapter II deals with *solar radiation* and contains 10 tables giving the results of exact observation on its character, at different altitudes and under different conditions. The next four chapters deal with the *transparency* of gases, liquids, solids and glass of various composition. Chapter VII takes up *reflection* of ultraviolet radiation, giving exact data regarding its reflection from many substances. The almost complete reflection from snow has much to do with snow blindness. Chapter VIII considers the Ultraviolet Radiation in Common Illuminants, IX Experimental Sources, X Detection and Measurement, XI Effects upon Living Matter, and XII Various Photochemic Effects.

Chapter XI is probably of most interest to the ophthalmologist. It will surprise those who have not made special studies in this direction, how much has been learned of the biologic relations of ultraviolet radiations. The causations of snow blindness and "electric" ophthalmia by these, and not by heat or visible radiations, seems quite certain. The limits of transparency to such radiations of the cornea, crystalline lens and vitreous, are determined in the same way as the transparency of air, water or glass. It is known that in childhood more ultraviolet radiations are transmitted thru the ocular media than in adult life, or old age. These radiations have far less power to coagulate proteins of the lens, aqueous and vitreous than other albumins, globulins, vitellin, etc., but the coagulability is increased by chlorids, sodium silicat or dextrose. The power of these radiations to kill living cells is turned to practical account in the sterilization of water, solutions, etc.

It is already clear that these radiations play an important part in ophthalmology. A more general understanding of the facts already established will probably suggest new and important practical applications of this knowledge. E. J.

American Academy of Ophthalmology and Oto-Laryngology. Transactions of the 27th Annual Meeting at Minneapolis and St. Paul, 1922. 608 pages, 125 illustrations. Published by the Academy, Clarence Loeb, Editor, Chicago.

In this volume over 225 pages are given to ophthalmology, 220 to oto-

laryngology, and 56 topics common to both; while about 100 pages are devoted to minutes of the meeting, list of officers and members and indexes. In form it corresponds to its predecessors in the series; in size and value of its contents, it surpasses them all. Among the papers relating to ophthalmology are several that will long be referred to as having contributed important facts to our knowledge of the subjects of which they treat. One of them, by Slocum and Finch, on the fundus changes in nephritis gives in tabular form records of 136 carefully studied cases.

The group of papers on tumors of the orbit and those on refraction, have been published in this JOURNAL. But the discussions on them, which completed these symposiums, participated in by ten and twelve speakers respectively, are published only in this volume. In addition to the address of Dr. Robert Bárány, of Upsala, Sweden, on a new radical operation for chronic ear suppuration, his interesting remarks in discussion of nystagmus were of equal interest to ophthalmologists and otologists. Local and regional anesthesia, sympathetic ophthalmia, smallpox keratitis and eye and ear conditions caused by impacted teeth, are also subjects of important papers and discussions. A paper by Dr. Burton on prehistoric nasal pathology, illustrated by photographs showing erosions of the bones of the face, is also of interest to ophthalmologists.

The minutes of the meeting contain much of interest to ophthalmologists and oto-laryngologists. At the opening of the meeting, the membership of the Academy totaled 1390; and from 97 applicants, 43 were added to the roll at this meeting. Their reports show that committees have been active on the following subjects: A National Medical Research Laboratory, Investigation of Iritis and Iridocyclitis, Publicity Service, Ophthalmic and Oto-Laryngologic Pathology, Ophthalmic Examinations, Examinations in Oto-Laryngology, and Standardization of Tuning Forks and Hearing Tests. The Section on Instruction reported a three days program, which was highly appreciated by about 400 who registered for it. This showed a popularity equal to that indicated by the registration of nearly 600 for the first course given in 1921 at Philadelphia.

The Academy is a very live organization, in some ways more representative of the profession interested in these "head specialties," than any of the other American national organizations working in the same field.

E. J.

The Anatomy of the Human Eye and Orbit. William N. Goldnamer, M.D., Chicago. Published by the Professional Press, Chicago, 1923.

This work, of two hundred pages, contains six roentgen photograms, fifty-one black and white illustrations, eight pages of colored plates, numerous tables, charts, and a glossary of anatomic ocular terms taken from the B. N. A. While the illustrations and plates are usually very good, they are unfortunately not numbered and therefore can be referred to only by page number. Most of them, the author states, are original drawings. A few are noted as taken from Fuchs' course of American lectures.

Altho print and paper are good, the work as a whole shows a want of careful proof reading. Typographic errors are not infrequent, there is no regular plan for the use of hyphens and capitals, and mistakes and inconsistencies are found, such as the use of Muller for Mueller and Koenigstien on one page and Koenigstein on another.

The work is divided into fifteen chapters. Perhaps the most valuable ones are Chapters VII and XV. The former contains the results of the author's measurements of the orbit of forty-one skulls from the Field Museum of Natural History. The latter gives numerous tables of various anatomic facts, collected from the literature. A bibliography of thirteen pages is appended, which would be improved by better proof reading and by numbering, accompanied by numbering of the reference in the text, so that when one reads the latter, he would know

from which one of an author's several articles the particular reference is taken. C. L.

Hygeia, a Journal of Individual and Community Health. Volume 1, No. 1, 66 pages, illustrated. Published by the American Medical Association, Chicago, 1923.

The publication of this journal by the American Medical Association is a real step forward. A most important part of the service rendered by every physician to his patients is the instruction he gives them as to methods of living, thru which they can regain and preserve health. The greatest service the medical profession renders the public is in its education as to questions of epidemic diseases, sanitary measures, enactments to prevent injuries, and furnish healthful conditions for homes, schools, factories and workshops. It is the part of common sense to adopt the most modern and efficient means for carrying on this educational service; and a thoroly modern magazine is admirably suited to the purpose.

Ophthalmology is ably represented in this first number. Following the editorials, which discuss seven live topics, and a paper on "The Control of Bodily Processes by Glands" from Prof. Cannon, of Harvard, comes a paper on "Some of the Causes of Eyestrain and Their Prevention" by George E. de Schweinitz. It deals with errors of refraction and the need for glasses in a clear, interesting and popular way; that does not, like much popular propaganda, lead up to the advice, have your eyes measured by a "skilled optometrist," but does emphasize the fact that the eye is a part of the body.

The whole list of contents is interesting, but we call special attention to the paper on Louis Pasteur and his work by Prof. Vaughan; one on "Public Health and Citizens Military Training Camps" by Surgeon General Ireland; and one by Dr. Lenna L. Means, that calls attention to the new movement among women, which has for its first objective "To establish the conviction that health is generally attainable thru individual effort and responsibility." Medical writers may need to cultivate the power of simple direct statement, and come to appreciate better the point of view of the non-medical public, before this journal can reach its full influence; but when it has done so, the patent medicine almanac and the advertisements of chiropractors and optometrists will lose much of their power to mislead the public. E. J.

CORRESPONDENCE.

Subjective Visual Impressions.

To the Editor: In the February, 1922, American Journal of Ophthalmology, I published under the head: Subjective Ocular Experiences, what seemed to me rather remarkable personal impressions experienced in an acute attack of conjunctivitis while under the influence of doses of opium, also during a colon bacillus pyeolocystitis, consisting of kaleidoscopic forms, colors, etc. As I have seen no mention of such experiences by others, I venture to send you the following: During a recent attack of "grippe" consisting mostly of a mild tracheal inflammation, as my inhalation of equal parts of spts. chloroform, eucalyptol and creosote did not quiet the cough, I placed 1/4 grain of codein in 2 drams of water in a small bottle, tipped the bottle to the tongue and under the 1/500 grain dose was at once relieved. Following this for about six days in bed (only one repetition of the codein), during all my waking hours, with the eyes closed, a constant procession of wonderfully beautiful color and form schemes passed before me; some kaleidoscopic, others in the form of silken tapestries. Mostly the forms and colors were independent of volition, but by imagining something, like a peacock or a sand hill crane for example, I could measurably determine the character of the succeeding images, which were altogether splendid. An artist or illustrator would have a gold mine if he could control such imaginings. Being entirely guiltless of artis-

tic ability or imagination myself, this experience was a great puzzle to me.

EDWARD J. BROWN, M.D.

Minneapolis, March 12, 1923.

Removal of Lime Deposits From Cornea.

TO THE EDITOR: The publication of Dr. L. F. Love's communication, (Vol. 6, No. 3, p. 174) on the use of alcohol as a solvent of deposits of lime salts in the cornea leads me to submit the follwing observation:

The affinity for alkalies possessed by holocain solutions (which renders their projection difficult) makes them an efficient, harmless and painless solvent of such deposits. If the overlying epithelium is intact, it is, of course, necessary to remove sufficient of it to admit solution. A 2% solution is used.

W. H. MERRILL.

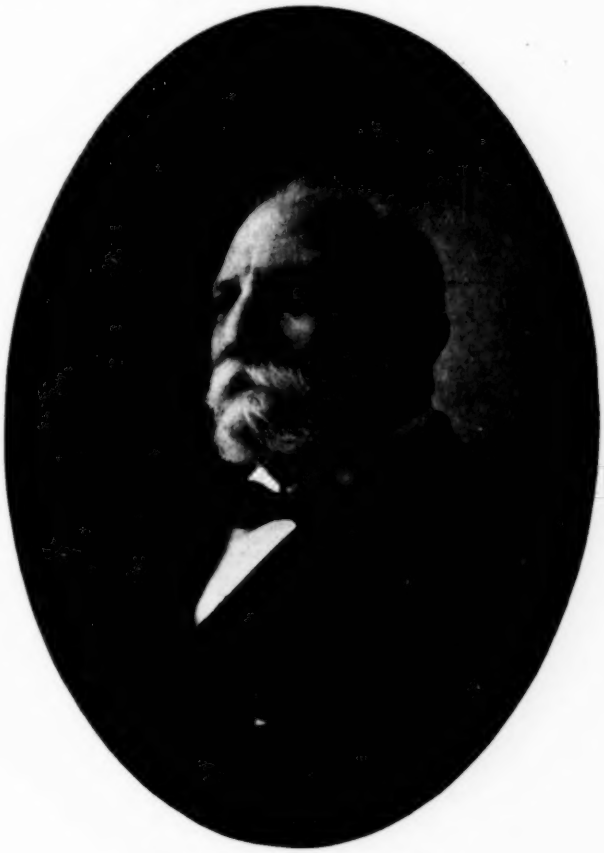
Lawrence, Mass.

BIOGRAPHIC NOTICES.

THOMAS HALL SHASTID.

DULUTH, MINN.

JUAN SANTOS FERNANDEZ, founder of ophthalmology in Cuba, died at Havana August 7, 1922. A son of Sr. Desiderio Fernandez, he was born at Alacranes, Matanzas Province, Cuba, in July, 1847.



Juan Santos Fernandez, 1847-1922.

Having received at the Jesuit College, Havana, the degree of B.S., he was sent to Spain at the age of 18, in order to study medicine at the University of Madrid. On this trip he was accompanied by a younger brother (who died in 1914), and by two other youths. These four students lived together in a large apartment in Madrid, and tales are still told of the merry pranks indulged in by the younger Fernandez and the two anonymous youths. The subject of this sketch,

however, tho he enjoyed to the full the practical jokes of his companions, never took part in them, and, in fact guided and restrained his comrades almost like a father. His quiet, sober disposition had, in fact, been characteristic of his childhood, and it remained a striking feature of his personality until his death.

Having obtained the degree of M.D., Dr. Fernandez studied ophthalmology, first at Madrid under Delgado Jugo. Later he went to Paris, where he became chief of clinic to Galezowski. Returning to Spain, he established an eye clinic near Toledo, and this he conducted for a number of years. In 1875 he went back to Cuba, where he was, it is said, the first on that island to practice ophthalmology exclusively. Since that time he has always been in the front rank of medical and sanitary advance. In fact there has not been any single manifestation of scientific progress in Cuba to which Dr. Fernandez's name has not been attached. In 1875 he founded the "Crónica Medico-Quirúrgica de la Habana," a medical monthly still published. In 1900, with Dr. Menacho, of Barcelona, Spain, he founded the "Archivos de Oftalmologia Hispano-Americanos," also still published and very prosperous.

In 1887 Dr. Fernandez founded the Laboratorio Anti-rábico, the first to be opened in America, and second only in the world to the Pasteur Institute of Paris. Many thousands of persons were thus saved from death by hydrophobia. Years before, he had bought and given to the Mercedes Hospital the first sterilization plant in Cuba. He was very active in all social and medical campaigns, for examples, he was a member of the Committee against Glanders, and the president of the Committee against Tuberculosis.

He was a member of the Havana Academy of Sciences, its president since 1900, a member of the Society for Clinical Studies, of the Cuban Anthropological Society, of the French Ophthalmological Association, of the Société d'Ophtalmologie de Paris, of the Mexican Academy of Medicine, of the American Academy of Ophthalmology and Oto-Laryngology (Honorary Fellow), and of many other medical associations.

As a writer, Dr. Fernandez was very prolific, having published over one thousand original papers in scientific journals of Europe and America. He was also fond of traveling, and made more than sixteen scientific trips to Europe and North America. All his voyages were followed by papers published in many journals.

He was a painstaking student, who enjoyed following up cases, and few records have been so well kept as his.

Dr. Fernandez was short and very heavily built. His hair and eyes were of a dark brown, his complexion ruddy. He was brisk in manner, kindly, not inclined to talk much, except when some favorite topic was broached. He was very helpful toward his younger brethren in the healing art, assisting often with books, money and advice. He had numerous well known pupils, among them his nephew, Dr. F. M. Fernandez, founder and still editor of the "Revista Cubana de Oftalmologia." He was very prominent in public affairs, politically a conservative. For many years he was president of the Havana Humane Society.

Dr. Fernandez married, at a date unknown to the writer, Srita Teresa Gonzalez.

He was one of the great workers of the world, and will be sadly missed.

ANDREW EDWARD FORSTER was born in St. Marys, Pennsylvania, August 28, 1876. He attended school at St. Marys and Coudesport, Pennsylvania, and St. Boneventure College, Allegany, New York. He graduated from Jefferson Medical College, Philadelphia, 1904, and was Interne at McKeesport, Pennsylvania, for one year. He located at Kalamazoo, Michigan, September, 1905, where he built up a very extensive practice in general medicine and surgery.

October, 1920, he enrolled in the postgraduate course in ophthalmology at the University of Pennsylvania, receiving his Master of Medical Science Degree, June 14th, 1922. June 24th, 1922, he went to Vienna and entered the clinics there. In August his health

failed and he returned to Philadelphia and was operated on at Misericordia Hospital and passed away August 24th, 1922, of cancer of liver. He was buried at St. Marys, Pennsylvania, August 28th. He is survived by his wife and 8 year old son, Andrew. He was a member of the American Medical Association, Kalamazoo Academy of Medicine, and International Ophthalmological Congress at Washington.

ABSTRACTS

Cosmettatos, G. F. Cyclopia in Triophthalmic Diprosopic Monsters. Ann. d'Ocul., 1921, v. 158, p. 349, 368.

This article, illustrated by 4 photographs and drawings, describes a case of the above. The head consisted of two heads fused posteriorly. One face was directed to the left and the other to the right, each possessing one eye. In a sort of groove between the two faces, the cyclopic eye was located. The two lateral were microphthalmic; the central possessed only one cornea. All of the lids had eyelashes at their free margins. A description of the anatomy of all of the eyes, and of the microscopic appearance of the cyclopic eye is given. The various theories and experiments are reviewed. These are fundamentally of two kinds, a single optic anlage, and by fusion of the two primary ones. The latter would seem to be proven in the present instance by the presence of two optic nerves. The presence of the retinas and the absence of the spinal canal would indicate that the deviation from normal started at the time when the optic anlagen were present, but before the closure of the neural groove. The presence of a well developed peripheral nerve system is no argument against this assumption, since it developes locally and not from neuroblasts of the central nervous system.

C. L.

Petit, P. J. Trachoma in Tunis. Ann. d'Ocul., 1921, v. 158, p. 567.

Statistics are given of the results of the author's investigations concerning the prevalence of trachoma in Tunis, especially in the schools. He found a proportion of 90% at Gafsa, 96% at Tozeur and Nefta. Corneal scars were found in 14% of the children at Gafsa, 29% at Tozeur and more than 59% at N[illegible]. The author was struck by the fact that severe lesions frequently produced little complaint on the part of the patient. They usually consulted him not for primary trachoma, but on account of corneal complications, etc. About a dozen cases had only one eye involved. There were some striking cases of immunity in the presence of the most predisposing factors. Several cases of gelatinous trachoma (Stellwag) were observed, more marked on the lower than the upper lid. Transference of the disease from individual to individual is undoubtedly the most common form of the propagation of trachoma. Its eradication will depend on treatment and isolation of the infected individuals.

C. L.

Rossi. Action of Lymphatic Gland Extracts on Glaucomatous Eyes. Arch. di Ott. 1921, v. 28, p. 102-110.

The author discusses the literature concerning the relation between general blood pressure and intraocular tension, and the difference of opinion which has arisen as to the effect of adrenalin by action on the sympathetic nerve endings. In order to demonstrate the effect of glandular extracts on the intraocular tension, the author tried extracts of lymph nodes, which were shown to exert a markedly depressing effect on the blood pressure of animals. In three glaucomatous cases, two drops of the extract were dropped into the eye, two or three times a day. A considerable decrease in tension was noted to occur after twenty-four hours, lasting apparently for considerable periods of time. No attempt was made to correlate these changes in tension with the general blood pressure.

S. R. G.

Mazzei. Changes in Corneal Endothelium after Paracentesis. Arch. di Ott., 1921, v. 28, p. 111-121.

The author reviews the work done by von Graefe and others, to determine the changes in the epithelium of the ciliary body and the iris after paracentesis. They found a vacuolization of the cytoplasm and certain changes in the nuclei. In their work, however, no mention was made of changes in the corneal endothelium. The author performed paracentesis on one eye of a number of rabbits and enucleated the eyes after five, ten and fifteen minutes; and after various intervals between one and forty-eight hours after operation, the other eye in every case being used as a control. He found changes similar to those described in the ciliary body by Carlini. The cells became full of vacuoles and the nuclei showed various deformities. The greatest change was seen after one hour; and from this, the change became slight, until after forty-eight hours, the cells were perfectly normal. S. R. G.

Angelucci. "Nocturne," (War Blindness). Arch. di Ott., 1922, v. 29, p. 193.

In this article the experiences of d'Annunzio, described in his "Nocturne," are analyzed and are considered as typical of the experience of many soldiers blinded in the world war. These soldiers show the same exaggeration of all sensations and of sensory memories in their first period of complete darkness. "Nocturne" is simply the product of an unusually sensitive soul, reacting to physical suffering. When the war blind soldier first leaves the hospital, his state of mind after all this suffering must be considered. He is exceedingly restless and anxious to grasp any thread which will bring him into relation again with the outside world. Thus it is that he takes up the study of music, typewriting, and any manual occupation with special enthusiasm and keeness, during this early period of convalescence. S. R. G.

Ida C. Mann, M.B., B.C. **Morphology of Certain Developmental Structures Associated with the Upper End of the Choroidal Fissure,** Brit. J. of Ophth., v. 6, p. 145, 1922.

On examining sections thru the center of the developing optic disc in human embryos of about the eleventh week, the nerve fibers, as they pass out of the eye, leave in the center of the disc a small rather funnel shaped interval which is filled in with a cellular tissue. There is no real depression below the general surface of the retina; indeed, in some specimens this small cone of cells form a slight elevation. There are two possible origins for these cells. They may be mesodermal elements carried in along the choroidal fissure with the arteria hyaloidea. They may be ectodermal in origin and derived from some part of the optic cup. The author shows by a morphologic study of sections from embryo eyes from humans, chicks, pigs, dog, fish, etc., that her observations support this second theory. Twelve photomicrographs accompany the contribution. Part II. On the morphologic value of certain nonpigmented cells found below the insertion of the optic stalk in the 15 mm. human embryo. In a section thru the optic cup in a 15 mm. embryo, the inner layer is everywhere separated from the outer layer. The outer layer show densely pigmented cells except at the posterior pole. This mass of unpigmented cells marks the situation of the upper end of the closed part of the choroidal fissure, the only open part of this upper end being at its extremity for the passage of the hyaloid artery. Ten photomicrographs illustrate the contribution and substantiate the assertion, that the little mass of unpigmented cells seen on the outside of the human embryo's eye at about six weeks is the remains of that portion of the inner layer which became everted in the lips of the fissure before closure. In the chick this occurs over a large area, and nerve fibers growing into it form what is known as the "cauda" of the nerve, but in mammals (including man) the eversion only takes place at the upper end of the cleft; no nerve fibers grow into it, and the entire mass of cells merely represents for a short time an abortive potential cauda. Under normal conditions it disappears rapidly and completely. D. F. H.

Moore, R. Foster, Lang, Basil T., Neame, Humphrey, and Doyne, P. G. Causes of Amaurosis in Infants. British Journal of Ophth. vol. 6, page 337, 1922.

This is a report based upon the observations of sixty cases, some of them over a period of nine years. Twenty-four points were inquired into such as family history, refraction, syphilis, fits, nystagmus etc. There were certain outstanding features; such as true temporary amaurosis which became mentally defective, the close relationship between delay in the development of the fixation reflex and the presence of albinism, and the association of certain signs or symptoms such as eye rubbing.

Under temporary amaurosis, the children were usually under two years of age with a history of fits, head retraction and vomiting. The failure of sight may be of short duration. The suggested pathologic basis is a basal meningitis sealing the foramen of Majendie, thus distending the third ventricle. The cases studied were arranged under headings such as mental deficiency, fits, delayed fixation, albinism, congenital cataract, congenital syphilis, consanguinity, difficult labor, premature birth, position in the family. As to signs or symptoms, reaction of the pupils to light, eye rubbing, head nodding, nystagmus, squint.

Of these sixty cases it would appear that the primary cause of the amaurosis was as follows:

Temporary amaurosis	5	cases
Mental deficiency	19	"
Albinism	17	"
Cataract	7	"
Hypermetropia	5	"
Fundus disease	7	"

Conclusions, (1) That absence of the light fixation reflex in infants, with otherwise normal eyes, is often an early sign of future mental deficiency.

(2) That delay in the appearance of the light fixation reflex is often associated with a pigment deficiency affecting the retina and choroid. That in these cases the light fixation is delayed only and will appear in due course.

(3) That the pupil reaction to light was only absent in those cases in which there was a definite disease of the optic nerve. All the cases of temporary amaurosis and of mental deficiency in this series presented an intact pupillary reflex arc.

(4) That congenital syphilis was established in only seven cases of this series.

(5) That such features as consanguinity of the parents, difficult labor, and premature birth of the infant, did not figure to any great extent in these cases.

(6) That the presence of eye rubbing usually denoted a local defect in the eyeball, such as cataract, refractive error or pigment deficiency.

D. F. H.

Wood, D. J., Onyx of Long Duration. British J. of Ophth., 1922, Vol. 6, p. 458.

A female, aged 26 years, whose left cornea presented a round nebula with a yellow opacity, asserted that it had been present since an attack of measles twenty years previous. It was a round cavity like a double watch glass, extending from the limbus to the inner third of the pupil. It extended to Descemet's membrane. The lower part contained a thickish pus. The eye was quiet, never having had an inflammatory attack. The cavity was incised and drained. While the outline remained visible on close inspection, it was not conspicuous.

D. F. H.

Wood, D. J., Intraocular Cysticercus. British J. of Ophth., 1922, vol. 6, p. 459.

This condition is more common in South Africa than in England. The author has observed six cases, reporting two in detail. Three were in the vitreous and one just over the yellow spot. One reported in detail was on the lower outer part of the iris, the second was bilateral, probably back of the choroid.

D. F. H.

Moore, Foster R., Evans Geoffrey, and Neame, Humphrey. Renal Retinitis. British J. of Ophth., v. 6, No. 5, p. 193, 1922.

This contribution contains a complete ophthalmologic and body examination, together with a postmortem examination and histologic examination of both eyes. The patient, a man aged 45 years, was under active observation for nineteen months. The fundi showed swollen disc, large retinal exudate, engorged vessels, and small retinal detachments below. During this period, his condition improved materially, V. = 6/18 and 6/60. Besides the signs of secondary atrophy and attenuated vessels, there is a very little exudate. During the succeeding five and a half years he was not seen. At this time, seven years after the onset of the disease, one day before his death, the fundi were but little altered since the last examination. Postmortem examination showed depressed, scarred kidneys, adherent capsule, and on section cortex reduced. Pelvis increased and vessels sclerosed. The eyeballs; the vitreous contained a veil like grey-white substance behind the lens, balance clear. The retina did not show anything that suggested its detachment. No apparent exudate in the choroid. Microscopic examination discloses no retinal detachment in either eye, but shows a slight amount of exudate in Henle's layer in the left, and also a peculiar localized pigment in the same locality of the retina.

The case is unusual in that it was observed from within six weeks of onset until the time of death. The points to be emphasized is the length of time of survival, (seven and one-half years) after the development of renal disease, the retinal detachments and their disappearance, the subsidence of the retinitis as watched with the ophthalmoscope, and the pathologic findings.

Retinal detachment is not rare if looked for up to the time of death. Retinitis, if capable of observing long enough, runs a definite course; it increases in severity until a cure is reached, followed by retrogressive changes. During the progressive stage, the exudate and hemorrhages absorb and recur but there comes a time when the absorption is in excess of fresh formation. The signs of subsidence is a reduction of the turgid condition of the vessels until they are ultimately smaller than normal. The veins make short craggy bends. The arteries greatly reduced in size show "pipe-stem sheathing." In the case cited at the end of a year, the signs of activity had largely gone.

It is a point of considerable interest to inquire whether a retinitis, once subsided, can recur should the nephritis become recrudescent. There is some evidence to show that an eye which has been the subject of serious pathologic processes of any kind, is, by this means, protected against the occurrence of retinitis of nephritis.

With regard to the present case, very few patients die in uremia without some fundus changes, and the authors feel that he would not have died in the manner he did without developing retinitis, had not his eyes been protected against its occurrence as a consequence of the atrophy following the previous disease.

D. F. H.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph L. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu; Dr. E. B. Cayce, Nashville, Tenn.; Dr. Gaylord C. Hall, Louisville, Ky.; Dr. Edward D. LeCompte, Salt Lake City.

DEATHS.

Dr. Alfred Henry Fison, of London, died recently.

Dr. A. H. Gaitskell, died at Westcliffe-on-Sea, January 1, 1923.

Dr. John R. Hoffman, Wilmette, Illinois, secretary and professor of opthalmology at the Chicago Eye, Ear, Nose and Throat College, aged fifty-seven, died February nineteen, of thrombosis.

Dr. George A. H. Smith, Freeport, New York, formerly assistant professor of diseases of the eye in the Long Island College Hospital, Brooklyn, aged forty-six, died February 19th, at the Post-Graduate Hospital, New York, from pneumonia following an operation for biliary calculi.

Dr. Alfred Nathan Strouse, New York, a member of the staff of the City Hospital and of the Asylum of St. Vincent de Paul, aged fifty-nine, died February Twelfth, following an operation for strangulated hernia.

William von Roentgen of Munich died recently at the age of seventy-eight. He belonged to all specialties because of having given us the X-ray.

Dr. Munoz Urra, of Talavera, died recently.

Dr. Joseph Weinstein, New York, aged forty-five, died recently at Frankfort, Germany.

PERSONALS.

Dr. Kasper Pischel, of San Francisco, is spending the winter in Europe.

Dr. G. B. S. Acharya has been appointed Professor of Ophthalmology in Lucknow University.

Dr. James H. Bell, formerly of San Antonio, Texas, has moved to Richmond, Virginia.

Dr. William L. Richardson, of Boston, has been appointed a trustee of the Perkins Institution for the Blind, Boston.

Professor J. Hirschberg delivered an address recently at a special meeting of the Berlin Medical Society, on "The Greek Canon of Ophthalmology."

Dr. P. A. Jordan, San Jose, California, has been spending a vacation in Honolulu and reports that he has enjoyed every minute of his visit.

Dr. George E. de Schweinitz, President of the American Medical Association, was given a dinner on March 6th, by the Chicago Ophthalmological Society.

Drs. Francis Lane, W. O. Nance and W. E. Gamble, of Chicago, are enjoying brief vacations in California. Dr. Gamble is to visit Honolulu before he returns home.

Dr. James M. Ball, of St. Louis, sailed for England on April 14th to attend the annual meeting of the Ophthalmological Society of the United Kingdom to be held in London, April 25th.

Pro. Alfred Vogt has been appointed Director of the University Eye Clinic at Zurich. He will give a course of lectures on "Slit Lamp Microscopy" there in September.

Drs. G. McD. Van Poole and Forrest J. Pinkerton, Honolulu, formed a copartnership for the practice of medicine, limiting their practice to eye, ear, nose and throat diseases.

Dr. George E. de Schweinitz, of Philadelphia, spoke on "Vascular Changes in the Eye and Their Relationship to Constitutional Diseases" at the University of Maryland School of Medicine, on February 15th.

Dr. and Mrs. Casey A. Wood sailed March 16th for the South Sea Islands, where they will spend the rest of the spring. They will visit the Fiji, Samoan and Tonga Islands, and arrive in Honolulu in July and stay there until September, and then return to California for the winter.

Dr. F. J. Pinkerton, of Honolulu, has returned from a protracted visit to the mainland. He spent several months with Dr. Shambaugh, of Chicago, and Dr. Weeks, of New York, investigating the more recent methods in the treatment of eye, ear, nose and throat diseases.

Dr. J. H. Farrel, of Honolulu, has returned from a trip to Europe. While he was away he visited the clinics in London, Vienna, Paris, and many cities in Belgium and Germany. He reports that the clinics are again organized and running as in the days before the war.

Louisa Paine Tingley, M.D., F.A.C.S., has been appointed Consultant in Ophthalmology to the permanent staff of the New England Deaconess Hospital of Boston, Massachusetts, and has also been elected a member of the New England Ophthalmological Society.

Dr. Wm. A. Fisher, of Chicago, has just returned from a trip to India. He brings back a very interesting description of the eye clinic in Shikarspur, under the management of Dr. Holland, a missionary surgeon. This is at the present time the largest eye clinic in the world; it is opened only six weeks in the year. On January 22nd Dr. Fisher performed one hundred cataract operations, the

results of which are to be published by Dr. Holland.

By the decree of January 17, 1923, M. Daniel Van Duyse, professor emeritus of the University of Gand, has been nominated Officer of the Legion of Honor. By this distinction, the Government of the Republic of France will have recompensed not only the eminent professor of clinical ophthalmology, the great anatomo-pathologist, the learned historian, whose works are universally known and admired, but also the man who, during more than forty years, and particularly in the sad hours of German occupation, never ceased to show great devotion to French science and touching affection for his French confreres.

SOCIETIES.

A very interesting meeting of the Eye, Ear, Nose and Throat section of the San Francisco County Medical Society took place January 23rd.

At the annual meeting of the Ophthalmological Club of Cincinnati, the following officers were elected for the ensuing year: President, Derrick T. Vail; Secretary, R. C. Heflebower; Treasurer, W. E. Schenck. Dr. Martin H. Fischer was the guest of honor.

At a joint meeting of the Chicago Medical Society and the Chicago Ophthalmological Society, held on March 7th, Dr. George E. de Schweinitz read a paper on "Practical Cooperation Work Between Medical and Surgical Practitioners and Ophthalmologists." Dr. Edward Jackson was present and participated in the discussion.

The thirty-sixth French Ophthalmological Congress will be held this year at Strasbourg, June 11th. A discussion on "Treatment by Subconjunctival Injections" is to be opened by Dr. Van Lint of Brussels. Dr. R. Onfray, 6, Avenue de la Motte-Pequet, Paris, is Secretary.

The next annual congress of the Ophthalmological Society of the United Kingdom was held on April 26, 27 and 28, at the Royal Society of Medicine, London. The Bowman Lecture was delivered by Dr. George E. de Schweinitz of Philadelphia, on "Certain Ocular Aspects of Pituitary Body Disorders, Mainly Exclusive of the Usual Central and Peripheral Hemiopic Field Defects."

The annual meeting of the Eye Sight Conservation Council of America was held in New York, February 6th, at the Pennsylvania Hotel, under the presidency of L. W. Wallace, Washington, D. C. General Director Guy A. Henry presented the annual report, stating that more than 533,000 folders and pamphlets had been sent out during the year. Prof. F. C. Caldwell, Ohio State University, delivered an address on "Glare," and Dr. Homer E. Smith, New York, spoke on "The Marvels of Vision."

The Section on Ophthalmology of the New York Academy of Medicine held a meeting March 19, 1923. By invitation Dr. T. B. Holloway of Philadelphia read a paper on "Refraction as We Teach It," with presentation of a "demonstration eye." Dr. A. E. Davis, "Refraction as We Practice It" and Dr. James W. White "Refraction and the Phorias."

The Brooklyn Ophthalmological Society held a scientific session, February 15, 1923. Papers were read by Dr. John H. Bailey on "The Surgical Anatomy of the Lacrimal Sac." (This paper will be published in full in the American Journal of Ophthalmology.) "Extirpation of the Lacrimal Sac Thru the Slit Canaliculi," by Dr. John M. Wheeler; "The Use of Large Probes in Treatment of Nasolacrimal Stenosis," Dr. J. Scott Wood; "Intranasal Dacryocystostomy," Dr. Albert J. Keenan. These papers were followed by a discussion opened by Dr. Alfred Wiener and Dr. Charles Hargitt.

The tenth annual convention of the Sioux Valley Eye and Ear Academy was held at Sioux City, Iowa, January 24th, Dr. James M. Patton of Omaha presiding. Among the speakers were Drs. George F. Suker, Harry L. Pollock and Clifford G. Grulee of Chicago and Dr. Martin H. Fischer of the University of Cincinnati. The following officers were elected for the ensuing year: President, Dr. Jesse B. Naftzger, Sioux City; Vice President, Dr. Samuel A. Keller, Sioux Falls, S. D., and Secretary, Dr. Lorenzo N. Grosvenor, Huron, S. D. The next meeting will be held at Omaha.

MISCELLANEOUS

The Boston Nursery for Blind Babies and the Perkins Institution for the Blind participated in donations from the will of Elizabeth Goldthwait Pierce of Newton, Mass.

The Department of Ophthalmology of the University of Rome offers two assistantships without salary to American graduates of Italian extraction. For further particulars address the Societa Medica Italiana, 47 West Forty-second Street, New York.

The Carthage Prize has been awarded for the first time to Dr. Nicolle, noted for his researches at Tunis on the transmission of typhus, trachoma, Malta fever and leismaniasis, etc.

The Eyesight Conservation Council of America has issued its second Bulletin, which presents a program for "Eyesight Conservation Day" in the public schools. A procedure is outlined for the examination of the eyes of all school children. The Council furnishes a vision chart and illustrated folders.

Examinations of the National Board of Medical Examiners will be held: Part I, June 25-27 and September 24-26, Part II, June 28-29 and September 27-28, 1923. Applications for these examinations must be made by May 15th to the Secretary, Dr. J. S. Rodman, 1310 Medical Arts Building, Philadelphia, Pa.

The South Dakota State Medical Association is conducting a campaign for dissemination of information on the care of the eyes. The state society is paying for this work from its own funds and Dr. Joseph G. Parson, Sioux Falls, chairman of the committee on conservation of vision for the state medical society, has been giving illustrated lectures on the care of the eyes to the various schools and college clubs in Sioux Falls and other towns.

Current Literature

These are the titles of papers bearing on ophthalmology. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in **heavy-face type.** The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is an abstract of the original article. (Bibl.) means bibliography and (Dis.) discussion published with a paper. Under repeated titles are given additional references to papers already noticed. To secure early mention, copies of papers or reprints should be sent to American Journal of Ophthalmology, 217 Imperial Building, Denver, Colorado.

BOOKS.

American Ophthalmological Society. Transactions. 58 Annual Meeting, Washington, D. C., 1922. 367 pages, 17 plates and 32 figures in text. Published by the Society, Philadelphia, 1922. A. J. O., 1923, v. 6, p. 244.

Elliot, R. H. Oftalmologia tropical. Translated by F. M. Fernandez. 587 pages, 7 plates, 123 illustrations. Published by Revista Cubana de Oftalmologia, Havana, 1922. A. J. O., 1923, v. 6., pp. 241 and 338.

Jackson, Chevalier. Bronchoscopy and Esophagoscopy. 346 pages, 4 color plates, 114 illustrations. W. B. Saunders Co., Philadelphia and London, 1922. A. J. O., 1923, v. 6, p. 246.

Kuffler, O. Jahresbericht ueber die gesamte Ophthalmologie, 1920. Julius Springer, Berlin, 1922. A. J. O., 1923, v. 6, p. 242.

Lagrange, F. Du glaucome et de l'hypotonie. Leur treatment chirurgical. 432 pages, 110 illustrations. O. Doin, Paris, 1922. J. A. M. A., 1923, v. 80, p. 575.

Pacific Coast Oto-Ophthalmological Society. Transactions. Tenth Annual Meeting, Salt Lake City. 116 pages, 11 plates, 17 figures in text. Published by Society, Salt Lake City, 1922. A. J. O., 1923, v. 6, p. 245.

Practical Medicine Series. Volume 3, Eye, Ear, Nose and Throat. Year Book Publishers, 304 S. Dearborn St., Chicago. A. J. O., 1923, v. 6, p. 245.

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